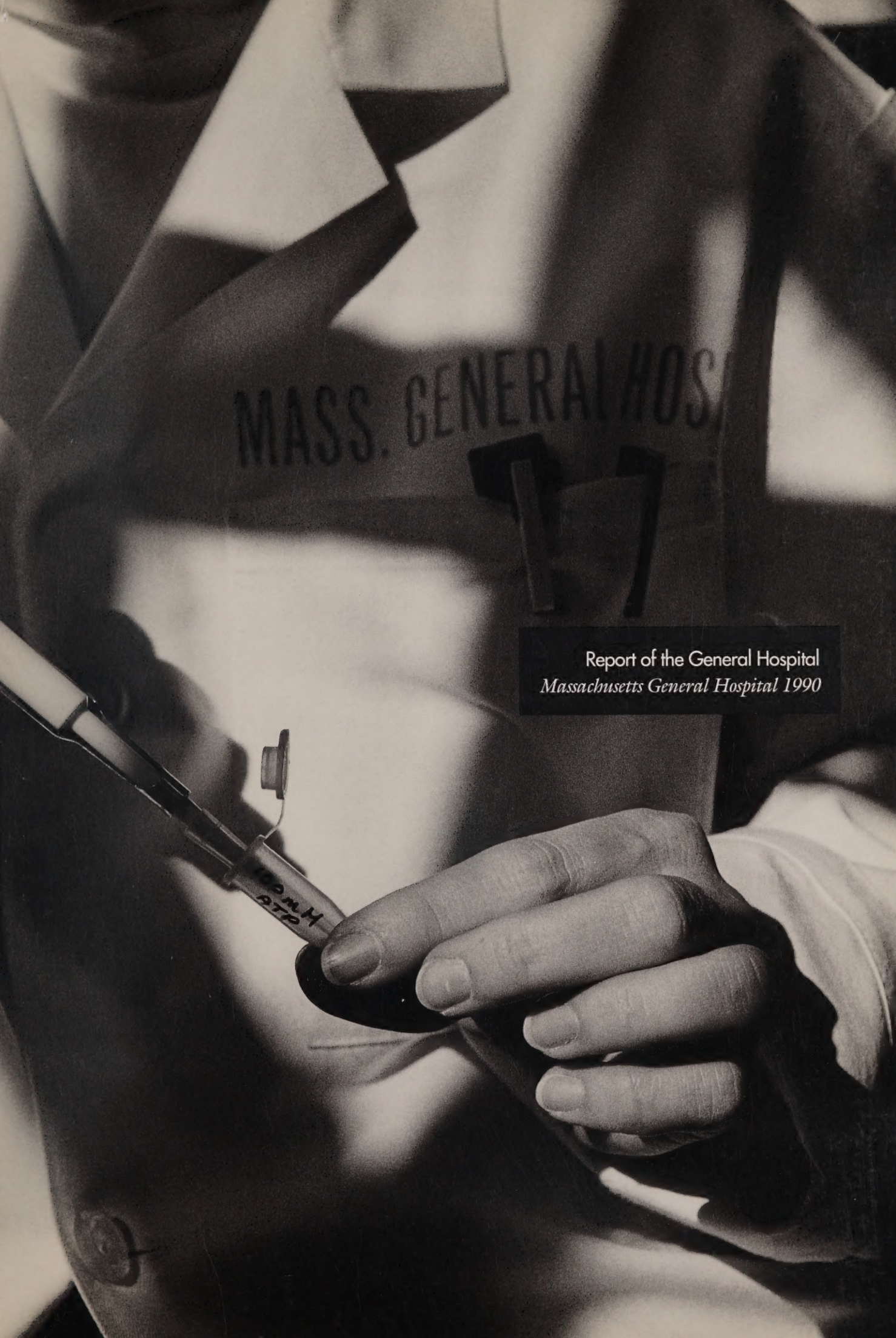

Report of the General Hospital

Massachusetts General Hospital 1990

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TO ALLEVIATE the pain and suffering of their patients, the staff of the Massachusetts General Hospital draws upon the most advanced clinical knowledge, techniques, and technologies available. Yet too often, today's knowledge falls short. The MGH is committed to research because it is essential to advancing our ability to treat disease and injury.

Of the three missions of this Hospital — patient care, education, and research — research is perhaps the least visible to the patient. Rarely does a patient enter a laboratory; research space is isolated from patient care units; even the Hospital's research budget is generated from funds completely separate from patient care. Perhaps a patient may be asked to participate in the trial of a new treatment, but even then, he or she encounters only the tip of a vast iceberg.

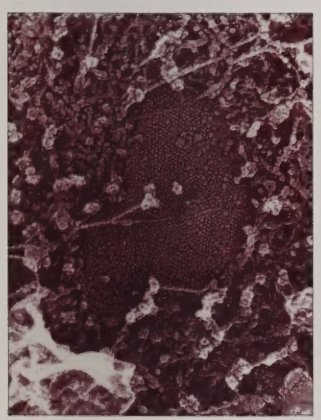
Thousands of physicians, scientists, engineers, nurses, and other individuals are at work throughout the Hospital's main campus and in the new MGH research labs in Charlestown. All of them are driven by a thirst to understand "how?" and "why?"

The questions they ask may have their roots in basic science: what does this gene do? Or clinical care: how can we better treat this tumor? Or technology development: how can we better detect this illness? But all of these individuals have a common goal — to improve patient care.

In this year's annual report, you will encounter a few of the many MGH professionals who struggle with the problems of research and who receive as their reward the excitement of a sudden insight or the satisfaction of seeing a patient recover. Ultimately, they can share in the knowledge that their discoveries may help an untold number of patients in the years ahead.

"Why do we do research? We are a hospital first and foremost, but as a great medical center we must continually develop new therapeutic approaches."

John Potts, M.D.
Chief of Medical Services



Inside Your Lung

Imagine you are looking out from the nucleus of a cell that lines your lung. Looking up, you see the cell's wall (above). In cystic fibrosis, something goes awry with the mechanism that moves salts across this wall. As a result, mucus in the lungs and digestive system thickens, causing life-threatening infections and cell destruction. A gene has been identified which produces a protein that seems to regulate this process. By inserting that protein into healthy lung cells, Dennis Ausiello, M.D., chief of the Renal Unit, hopes to learn its precise role. "Then," he says, "we may be able to find ways to help the body overcome the problem."

SITTING STILL for only a moment, Tommy Melville comments, "I'm a bowling addict." At 10 years of age, he already has three trophies to his credit. His 13-year-old sister Laura plays on her school softball team and is a serious fan of the pop music band "New Kids on the Block." Every day, they do a half hour of chest physical therapy with their mother, who claps them on their backs to loosen the mucus that clogs their lungs. Tommy and Laura have cystic fibrosis.

Medicine has progressed far in being able to treat children like Tommy and Laura; however, as yet there is no cure for this disease. And before clinicians can provide a cure, researchers must learn what is going wrong within the cells of these children's lungs.

Spending their professional lives in a world few of us will ever see, basic science investigators seek simply to understand. The discoveries they make lay the foundation for earlier diagnosis, more effective treatment, and ultimately, the prevention of disease.

The developments of molecular and genetic biology have placed remarkable tools in the hands of biomedical investigators. Where scientists once were limited to observing nature, they can now manipulate biological processes to learn how they function. They can look inside cells, examine aberrations in genes, and trace the pathways of the molecular processes that sustain life.

The microscopic terrain of cells and molecules has become familiar ground to these researchers. And with each new map they draw, our understanding of disease moves a step forward.

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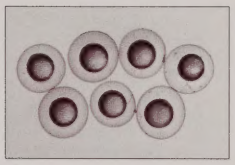

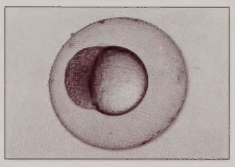

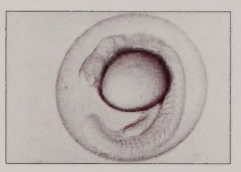

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The Genetic Development of the Heart

Molecular and genetic studies have revealed much about how individual cells function but less about how genes affect the formation of whole organs. Mark Fishman, M.D., director of the MGH Cardiovascular Research Center, and his colleagues are studying the zebrafish to learn how genes affect development of the heart and how mutations may result in heart disease. Using these fish, which produce thousands of transparent eggs, they can screen for mutations and watch each stage of fish heart development under the microscope.

"Since crucial genes tend to be conserved through evolution and across species," says Dr. Fishman, "once we identify abnormal genes in fish, we can screen for related genes in humans."

2

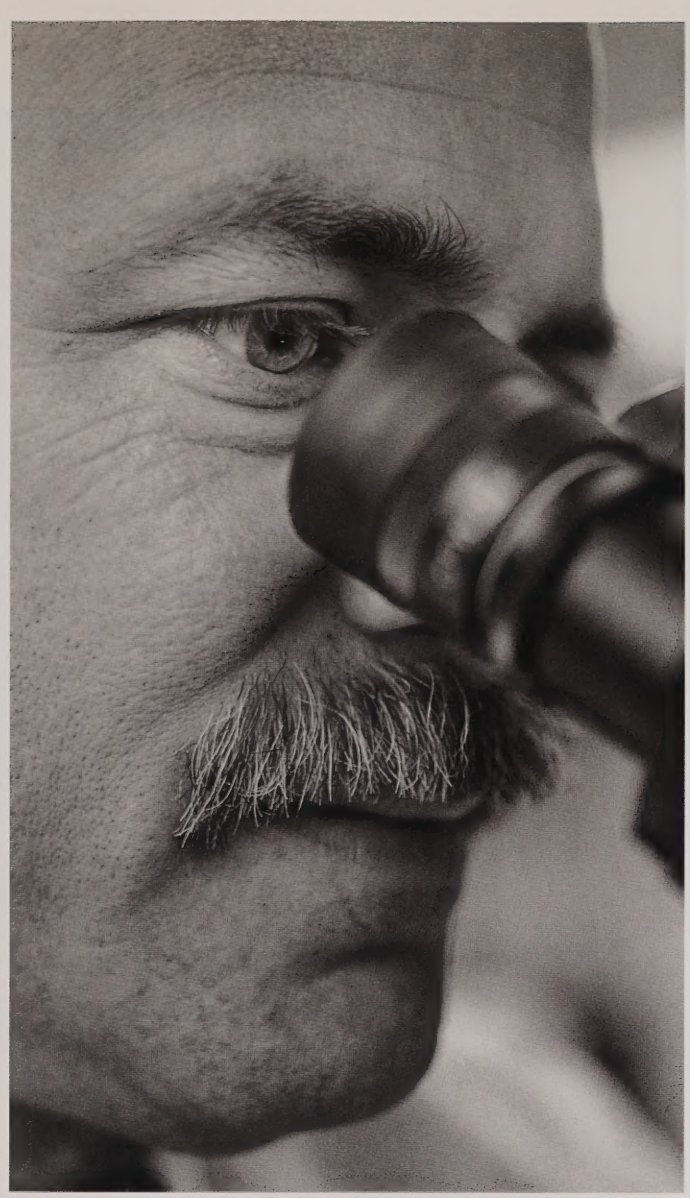
Preventing Bone Breakdown

Calcitonin is a hormone that prevents cells from breaking down bone. Understanding how it works may provide insights into rheumatoid arthritis, osteoporosis, and other bone disorders. Steven Goldring, M.D., and researchers in the MGH Arthritis Laboratory, working with Herbert Lin, a graduate student in Professor Harvey Lodish's laboratory at MIT, recently identified the receptor for this hormone.

An exciting aspect of the discovery is that the calcitonin receptor has a unique structure and could be a member of a new family of receptors, says Dr. Goldring, who directs the research team at the MGH.

"Basic scientists are driven by curiosity. They love solving problems, figuring out how and why things work — or don't work. They get most excited when the various pieces of a puzzle suddenly fall into place and a new pattern is revealed. Basic scientists must be free to pursue unusual observations, for often those observations lead to new discoveries."

Kurt Isselbacher, M.D.
Director of the MGH
Cancer Center



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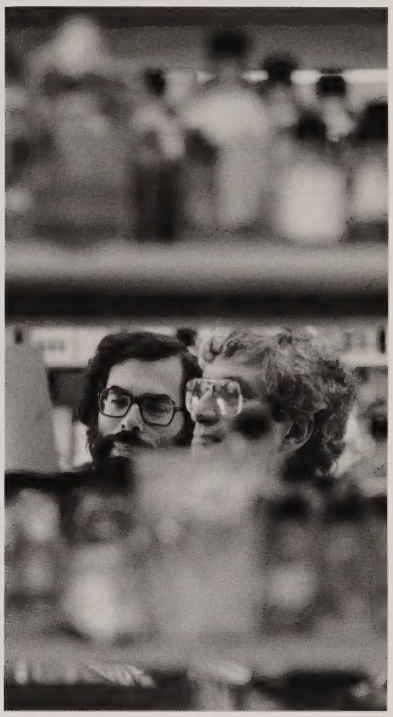

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3
Understanding the Immune System

In protecting our body against disease, molecules from the major histocompatibility complex (MHC) play a key role. These molecules latch onto protein fragments inside a cell and shuttle them to the cell surface, where they present them to the immune system's white blood cells for approval. If the immune system recognizes a fragment as foreign, it attacks and destroys the cell. Most of the time, this reaction is desirable, for it helps eliminate virus-infected and cancerous cells.

However, this response also causes rejection following organ transplantation and — if the system goes awry — causes auto-immune diseases in which the body attacks itself.

Led by Gerry Waneck, Ph.D., investigators in the Surgery Services' Molecular Immunology Laboratory are using genetic engineering to redesign these molecules to learn how they work.

4
How the Body Builds Bone

Over the last 50 years, MGH researchers in the Endocrine Research Laboratory have sought to understand how calcium is utilized by the body. Most recently, this interest has led to the discovery of the receptor for parathyroid hormone (PTH) by Gino Segre, M.D., Henry Kronenberg, M.D., Abdul B. Abou-Samra, M.D., Ph.D., Harald Jueppner, M.D., Ernestina Schipani, M.D., Xiang-fu Kong, Ph.D., and Mason Freeman, M.D. This receptor plays a key role in bone metabolism and the body's mechanism for transporting calcium. "We hope that by identifying the receptor, we can begin to understand the role of this hormone at the molecular level, particularly in bone, with the hope of eventually improving therapy for bone-loss diseases, such as osteoporosis," explains Dr. Segre.

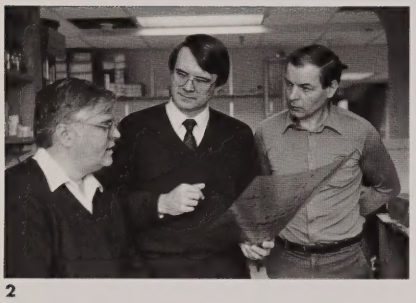
1

"The questions that need to be answered and the techniques required to solve them are so much more complicated today that to solve a really tough problem you need the ideas of more than one brain and more than one background."

W. Gerald Austen, M.D.
Chief of Surgical Services

"The MGH attracts many talented people with different backgrounds and interests. By becoming colleagues and collaborators, they not only generate creative new ideas, but they are able to develop the means to explore them."

Stephen Krane, M.D.
Chief of the Arthritis Unit



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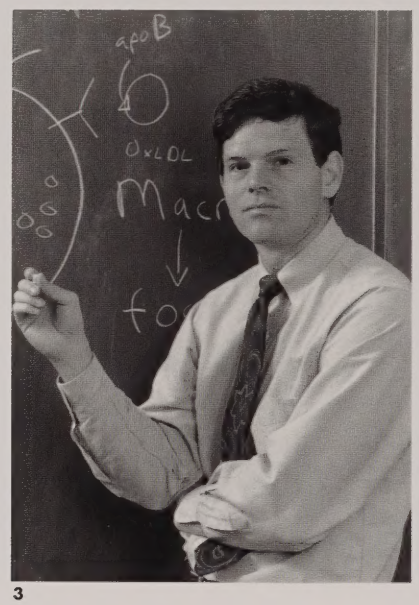

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1

Tumor Suppressor Genes

For the small number of families in the world with Li-Fraumeni Syndrome, cancer is an ever-present concern. Those afflicted inherit an exceptionally high risk of developing breast, bone, and a variety of other cancers. A team of MGH Cancer Center researchers led by Stephen Friend, M.D., Ph.D., in collaboration with researchers at the Dana Farber Cancer Institute and the M.D. Anderson Cancer Center, has identified the root cause of this syndrome — a defect in a gene called p53, which normally suppresses the uncontrolled growth of cells.

One offshoot of this discovery is that researchers may be able to develop a screening test for families with a strong history of breast cancer, a disease which is highly curable if caught early.

2

Cancer, Genetics, and the Nervous System

Neurofibromatosis is an inherited disorder that can cause multiple tumors in the brain, spinal cord, nerves, skin, and internal organs. Neurosurgeon Robert Martuza, M.D., molecular geneticist James Gusella, Ph.D., and pathologist Jean Paul Vonsattel, M.D., are members of an MGH team that has identified genes that cause two forms of this disease.

"Working with the Pathology Department, we have been able to bring some of the tumors removed in the operating room into the laboratory to study their genetic development," says Dr. Martuza. "The abnormalities of neurofibromatosis may involve the same mechanisms that cause non-inherited forms of tumor growth. Ultimately, studying this disease could lead to better diagnosis and treatment of tumors affecting the nervous system."

5

3
A Cholesterol Receptor

Atherosclerosis — the build-up of plaque within arteries — is the leading cause of death in the United States. Changing this fact will require understanding how the disease develops. Collaborating with researchers at MIT, Mason Freeman, M.D., an endocrinologist who directs the Hospital's cholesterol clinic, helped identify a receptor that binds cholesterol-rich particles. The discovery may help explain how cholesterol builds up and ultimately clogs arteries.

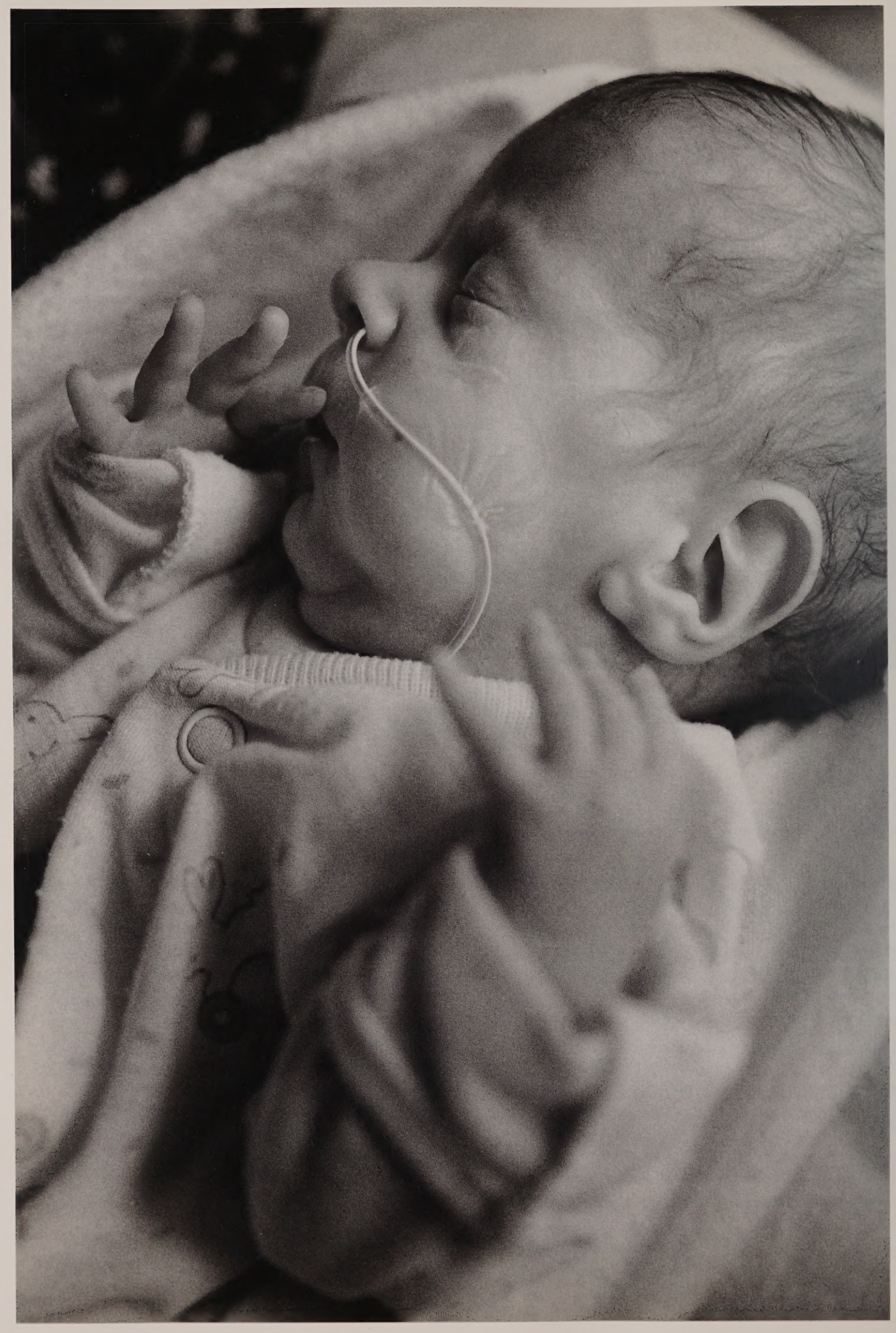
4
Research Reviewers

Several committees oversee MGH research. The Committee on Research consists of leading MGH clinicians and scientists. From this group is drawn the Executive Committee on Research, which sets Hospital research policy. The Scientific Advisory Committee, composed of eminent investigators from other institutions, advises the Trustees on the "quality, balance, and direction" of MGH research. Highlights of the committee's annual review are a symposium and a poster session displaying MGH research projects.

5
Psychiatry and Molecular Biology

Steven Hyman, M.D., supervises psychiatric residents in the MGH Emergency Department. He is also a molecular neurobiologist at the MGH Neuroscience Center in Charlestown. As a clinical psychiatrist, he sees firsthand the effects of psychiatric illnesses and drug abuse. These observations lead to questions he brings back to the laboratory.

For example, why does it take several weeks before medications to treat mental illnesses have an effect and before drugs of abuse cause dependency? Apparently, these drugs attach to receptors on nerve cells, setting off a chain of reactions inside the cell and turning certain genes on or off. "If we can identify the critical changes caused by these drugs, we may be able to develop more precise medications for the treatment of mental disorders and drug addiction," says Dr. Hyman.



"Working in a hospital keeps me in touch with the ultimate goal — to save human lives. It keeps reminding me of why I do research. Until we understand basic life processes, we can't solve the problems of human disease."

Gerry Waneck, Ph.D.,
A principal investigator in the Surgery Research Laboratories

Protecting Newborns

Researchers have long believed a mother passes antibodies against infection to her unborn child only through the placenta just before birth. Recently, Esther Jacobowitz Israel, M.D., discovered a receptor which may shuttle antibodies from the mother to the fetus's intestinal tract. The receptor is present during the first trimester. This finding helps explain how premature infants, who were thought to have no immunities against infections, can survive. "Our goal," says W. Allan Walker, M.D., chief of the Pediatric Gastroenterology Unit, "is to learn how our immune defenses develop and to find ways of accelerating this development in premature infants."

ALYSSA WAS BORN just 25 and a half weeks after her mother became pregnant. Since her premature birth, Alyssa has been growing larger and stronger, cared for by her mother and the nurses and physicians of the MGH neonatal intensive care unit.

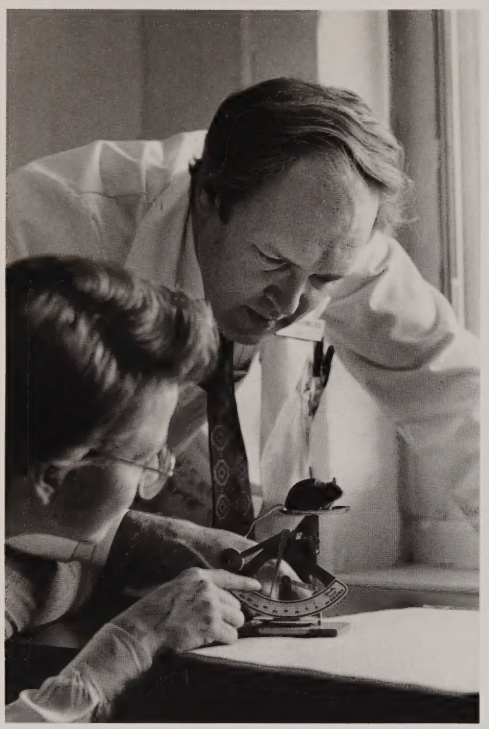
Consulting on the care of children like Alyssa occupies half the time of pediatric gastroenterologist Esther Jacobowitz Israel, M.D. She spends the other half in the laboratory, trying to gain a better understanding of how the tiny bodies of neonates grow and develop defenses against infection.

Dr. Israel is part of a broad spectrum of MGH researchers. At one end are those who spend their professional lives immersed in the language and techniques of modern basic science. At the other end are those who are focused solely on the needs of patients. In between are individuals versed in both worlds, who — through their own work and their collaboration with others — serve as translators, connecting both ends of the spectrum.

These individuals play a vital role in carrying medical science through a transitional stage, where knowledge gained in the laboratory by simply seeking to understand is turned toward the practical purpose of bringing new treatments to the bedside.

Ask researchers how they identify when a scientific finding can be applied to patient care and they are hard pressed to answer. It is like asking a musician how he composes a melody or a novelist how she selects a plot. There is no formula; it comes down to a gut feeling.

But one thing is certain: The interaction between the scientist and the clinician produces a creative synergy that is yielding startling new approaches to fighting disease.



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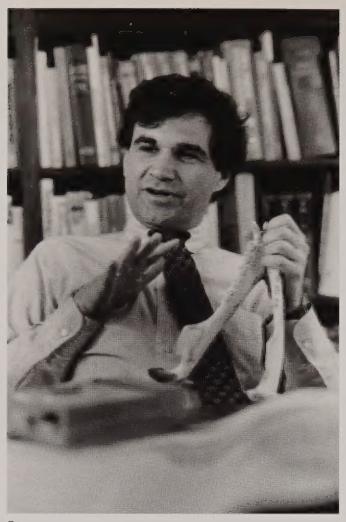

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Pancreatic Islet Cell Transplantation

Within the pancreas of many diabetic patients, the insulin-producing "islet cells" have been destroyed. Denise Faustman, M.D., Ph.D., of the Diabetes Research Laboratory and Hugh Auchincloss, M.D., a transplant surgeon, are conducting animal studies to learn whether diabetes could be cured by transplanting these crucial cells, without the need for immunosuppressive drugs.

"Lifelong immunosuppression is too toxic for healthy young diabetes patients," says Dr. Faustman. "At the same time, there will never be enough human islet cells available to treat the millions of people with diabetes." Therefore, the team is developing techniques to purify islet cells from pigs as well as methods to transplant these islets into diabetic patients without immunosuppression. Achieving cross-species transplants (or xenografts) could open the way for major advances in cell and organ transplantation.

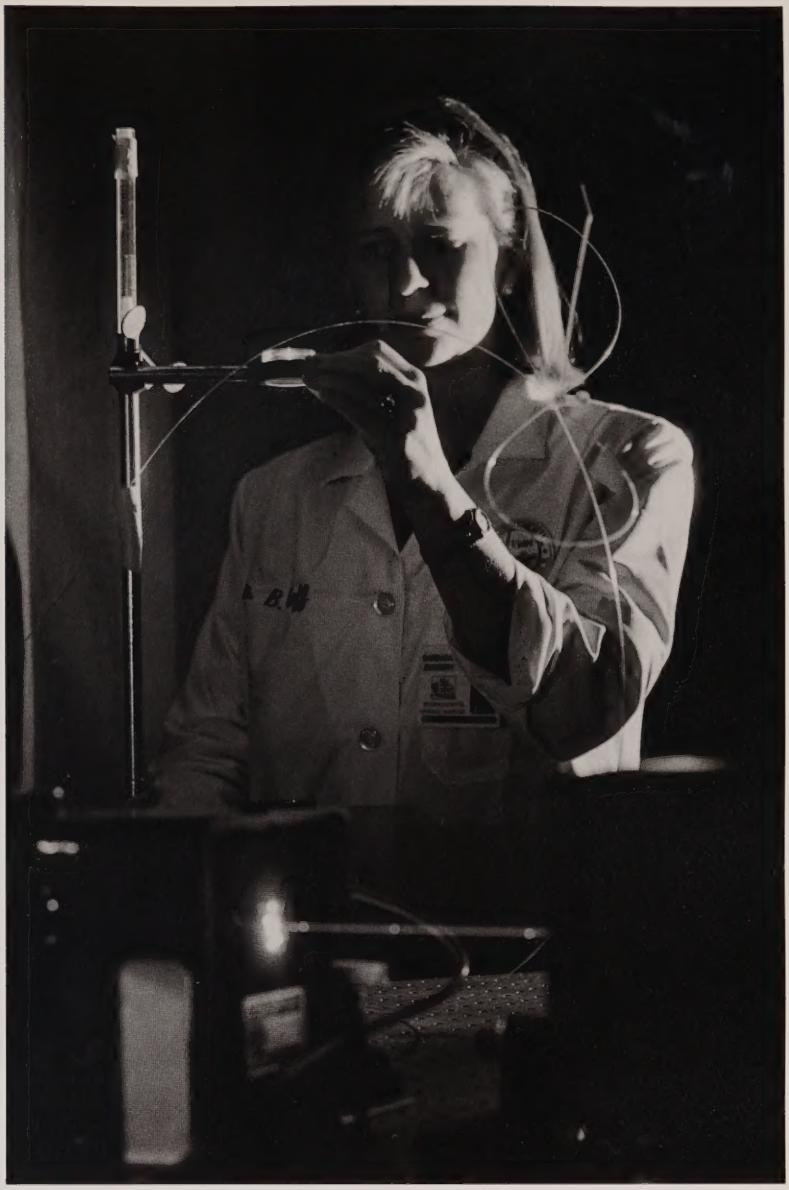
2

Antarctic Seals and Asian Women Divers

Twenty-five years ago, anesthesiologist Warren Zapol, M.D., was one of the pioneers in the development of the extracorporeal membrane oxygenator, a device which is saving increasing numbers of newborns with life-threatening respiratory problems. He is building on his knowledge of the respiratory system by studying Antarctic seals, which can dive 1,500 feet underwater for an hour or more, and Japanese and Korean women shellfish harvesters, who make repeated 45-foot dives, each lasting almost a minute. Through these field studies, he is gaining a greater understanding of how animals and people respond to oxygen deprivation.

"I tell the scientists in the lab a project has to meet three criteria: It has to be interesting to work on, it has to be possible to find an answer, and it has to be medically important. The last comes from being in a problem-rich environment — we see patients whom we can't help and we want to make a difference."

John Parrish, M.D.,
Director of the MGH Wellman Research
Laboratories of Photomedicine



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3
Infectious Disease Vaccines

Every year, at least 5.5 million people worldwide contract cholera, and 100,000 of these individuals die from this diarrheal disease. MGH and Harvard Medical School investigators have developed an oral vaccine made of a live cholera bacteria that has two mutations. The mutations render the bacteria harmless but still capable of causing the body's immune system to develop antibodies against the disease. Now researchers, led by Stephen Calderwood, M.D., chief of the Hospital's Infectious Disease Unit, are trying to determine which products from other diarrhea-causing bacteria induce the body to generate immunity. They can then attach these molecules to the cholera vaccine like beads on a necklace and vaccinate against several diseases with one dose. Their goal is to develop an effective, easily administered vaccine for use in developing countries where these diseases still run rampant.

4
Ovarian Cancer

Chemotherapy is a powerful way of killing cancer cells. It also kills fast-growing normal cells, causing numerous side effects. Barbara Goff, M.D., a researcher in the Vincent Memorial Hospital and the MGH Wellman Research Laboratories of Photomedicine, is developing a way to more precisely target and destroy ovarian tumors. She has attached a light sensitive anti-cancer chemical to a monoclonal antibody designed to bind only with ovarian cancer cells. She hopes that by activating the drug with laser light the cancer cells will be killed, leaving surrounding tissue unharmed.

1

1
Vascular Surgery

The inspiration came some 20 years ago at the Boston Museum of Science. An exhibit showed that water is pumped more efficiently through an elastic pipe than through a rigid pipe. "We realized," says William M. Abbott, M.D., chief of vascular surgery, "that is one of the problems with the artificial blood vessels we use — they're rigid." Since then, the vascular research laboratory has developed the technology to measure how blood vessels expand and contract and how this movement affects the flow of blood. They plan to use these measurements to develop artificial blood vessels with improved function and better acceptance by patients.

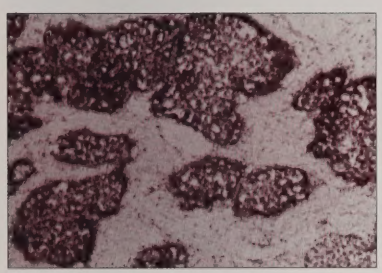
2
Fighting Chronic Liver Disease

Some 400 million individuals worldwide are affected by chronic hepatitis B. The virus infects the liver, where it causes cirrhosis and can lead to liver cancer. The MGH is developing small molecules called monoclonal antibodies (the small black dots in the photo above) which latch onto liver cancer cells. The researchers can attach fluorescent drugs to the monoclonal antibodies, making the cancer cells more visible and the disease easier to diagnose, or they can use the monoclonal antibodies to carry cancer-killing drugs directly to malignant cells.

Jack Wands, M.D., and his MGH Cancer Center colleagues are also doing basic research aimed at preventing liver cancer. Using a new monoclonal antibody test developed at the MGH, researchers have found that in 80 to 90 percent of patients, hepatitis may lead to liver cancer, underscoring the need for rapid treatment of this infectious disease.

"Often the situation arises in a hospital like this where you can envision an innovative therapy, but the technology to do it is not available yet. So physicians and researchers find themselves in a situation where the only answer is to develop the technology, either themselves or in collaboration with industry. This is what keeps us on the cutting edge in delivering innovative care."

Ronald S. Newbower, Ph.D.,
Vice president for Research and
Technology Affairs



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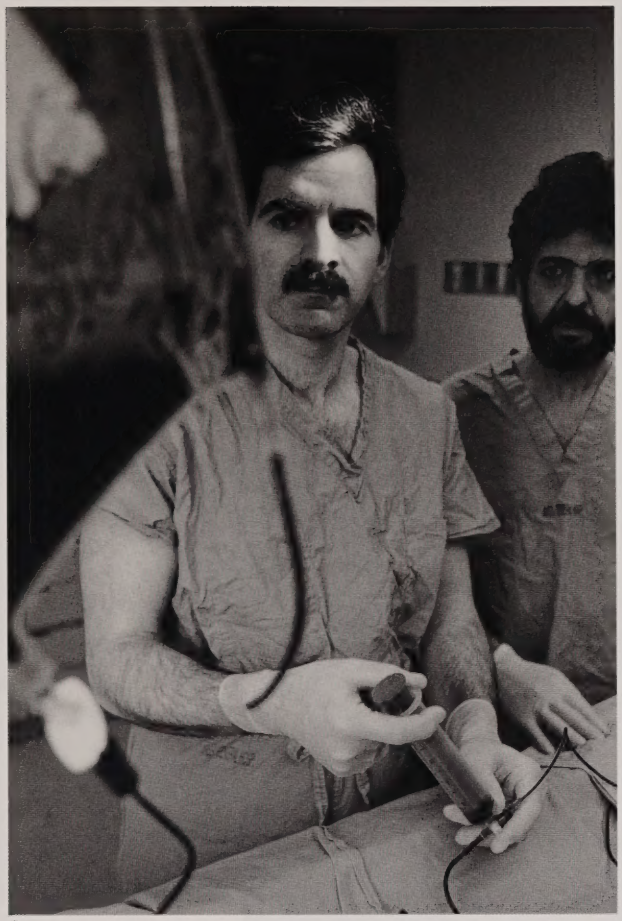

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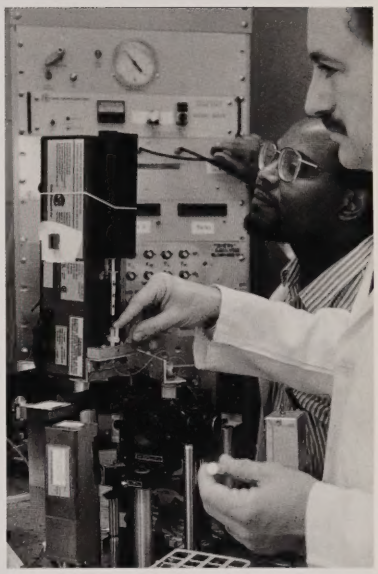

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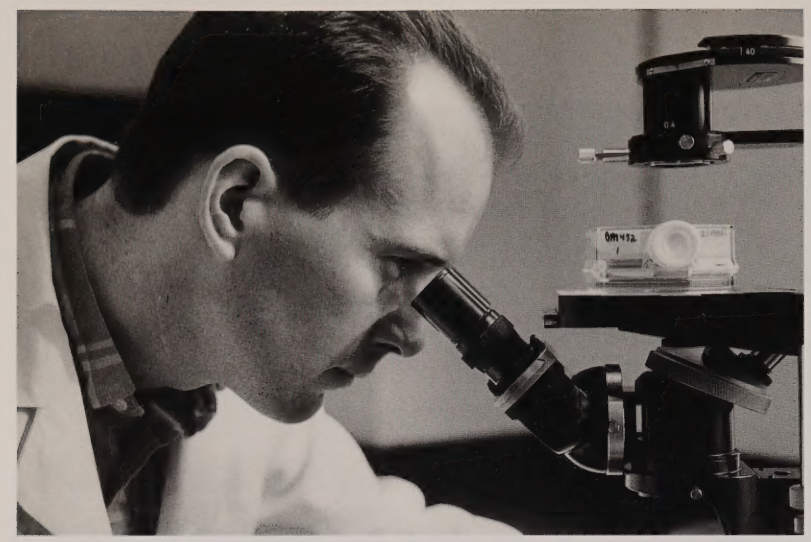
Artificial Blood

Led by cardiac surgeon Gus Vlahakes, M.D., MGH researchers are playing a leading role in studying and testing artificial blood. The substance, which was developed by Biopure Corporation, is made of highly purified bovine hemoglobin. It requires no cross-matching with a recipient's blood type and effectively performs blood's most vital role — delivering oxygen throughout the body. In studies with sheep, researchers replaced over 95 percent of the animals' blood with the substitute without any adverse effects. If human studies are also successful, the new substance could offer an unlimited source of contamination-free blood to the world. The substance could be used during surgery or to treat trauma and would gradually be replaced with natural blood by the body.

4

Bone Tumors

Under the pathology microscope, all bone cancer tumors look very similar. However, on the genetic level, these tumors may be very different. Mark Gebhardt, M.D., is testing a process called "flow cytometry" which, when used to examine the DNA of tumor cells, can rapidly assess not only whether a tumor is malignant but also its degree of aggressiveness and probable response to therapy. This could help physicians make more accurate prognoses for cancer patients and determine the precise treatment that is best for each.



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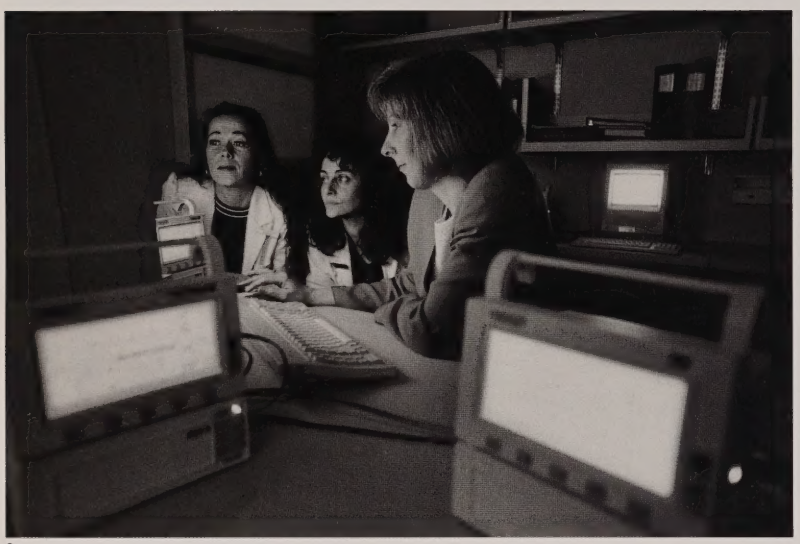
"No single investigator is in the position to put the resources and facilities together to do research in high technology. That responsibility rests with the institution."

James Thrall, M.D.
Chief of Radiology



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1
Inhibiting Cancer Cell Growth

A hormone that inhibits the growth of the female sex organs in the fetus holds promise as a new type of treatment for cancer. Researchers in the Pediatric Surgery Laboratory theorized that Müllerian Inhibiting Substance (MIS) may have the same effect on cancer cells as it has in the fetus. "We are searching for targeted ways to manipulate the genetic instructions of malignant cells," says Patricia K. Donahoe, M.D., chief of pediatric surgery. Their goal is simply to stop cancer cells from growing.

MIS is manufactured by the body in very small amounts; however, investigators are using recombinant DNA technology to develop a method for producing large quantities of the substance. In test tube and animal studies, the substance has shown promise not only in slowing the growth of gynecologic cancer cells — where it would be expected to be most effective — but also in ocular melanoma.

2
Flexible Patient Monitoring

The path to health isn't always a smooth one. One day a patient may be doing well, the next he may need intensive surveillance of his vital signs. But moving such a patient to the intensive care unit can be unnecessarily traumatic and expensive if the patient does not need the one-to-one nursing of intensive care.

So rather than bring the patient to the technology, a team of MGH nurses, physicians, and biomedical engineers has developed a system that brings the technology to the patient. Patients on general care floors who need vital signs surveillance are connected to small, portable monitors, which are linked to a computer screen located at the nurses' station. Using the workstation display, nurses can continuously monitor the heart rate, blood pressure, oxygen blood level, and other parameters of eight or more patients simultaneously, around the clock.

4

3
Viewing Chemical Activity in the Body

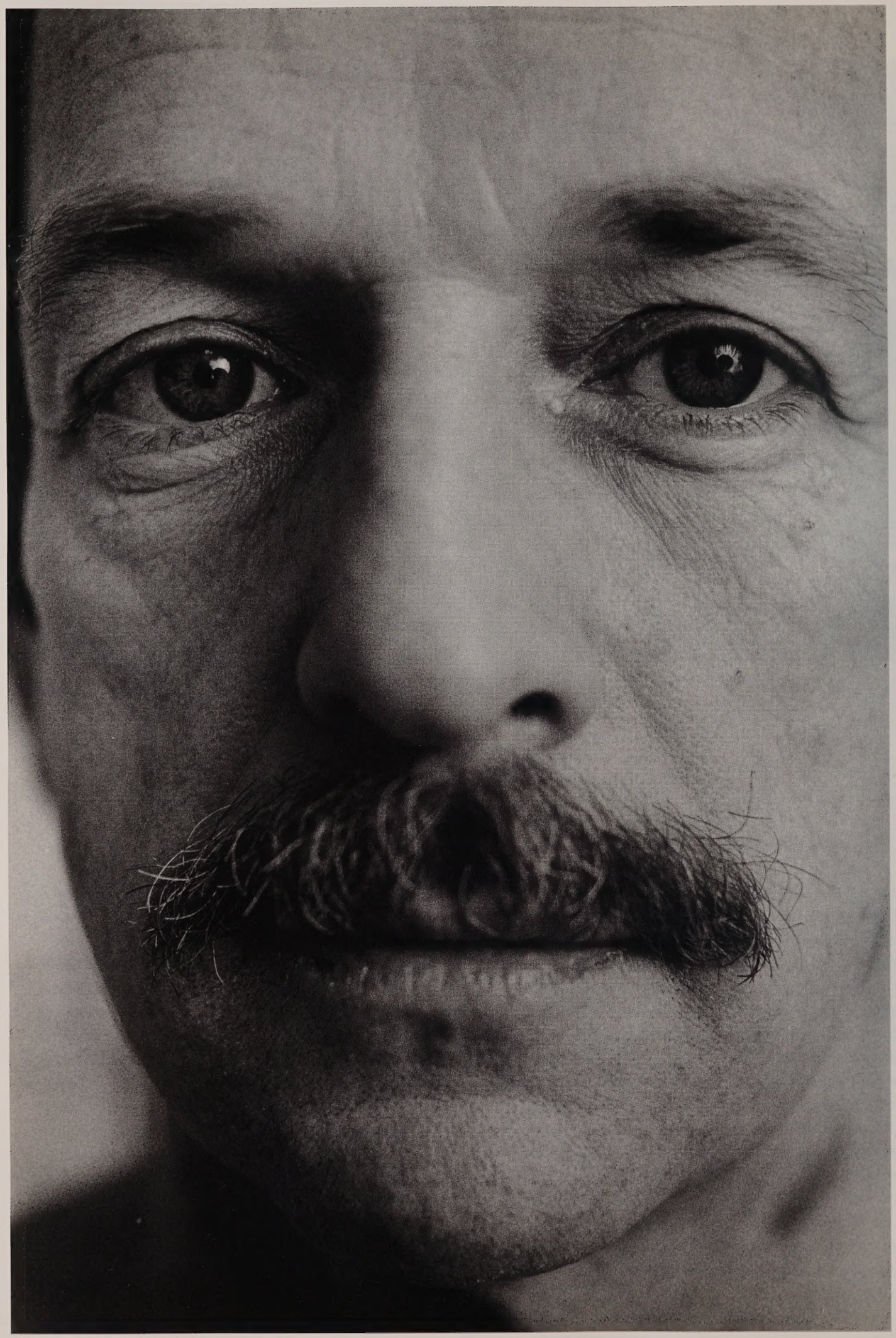
Positron emission tomography (PET) scanning allows researchers to see and measure chemical activity within the body. In collaboration with Alan Fischman, M.D., H. William Strauss, M.D., and other members of the Nuclear Medicine Department, Robert H. Rubin, M.D., of the Infectious Disease Unit is using PET to develop more effective drug therapies.

PET technology is enabling Dr. Rubin to study how medications interact with normal and diseased tissue. Such studies allow physicians to determine the exact dosages that are needed to treat different diseases, the range of disease that can be treated, and many of the side effects that may be encountered. Already, this important technology has proven useful in evaluating new drugs against infectious, cardiac, and neuropsychiatric disease.

Also, "following a stroke or heart attack," reports Dr. Rubin, "you can use PET to identify what tissue has died, what is threatened, and what is still healthy." This will enable physicians to target drug therapies to the tissues that can be saved or protected.

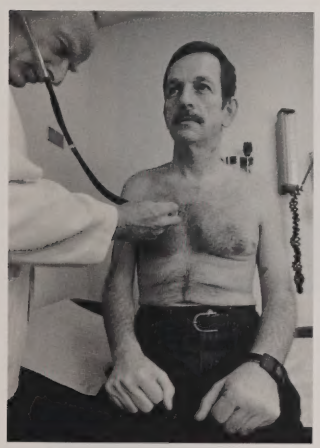
4
Imaging the Brain

The MGH, an early pioneer in magnetic resonance imaging, is the home of the world's most advanced MRI machine. The machine allows researchers such as Bruce Rosen, Ph.D., and Verne Caviness, Jr., M.D., to observe how different parts of the brain respond to stimuli or thought processes. "We can actually watch the brain working," says Dr. Rosen. With this technology, they are beginning to develop the first MRI-based "functional map" of the brain. This will enable them to study in detail the results of neurological injury or illness.



"It's amazing how courageous people are, particularly when they are faced with their own illness. Often they will step outside of themselves and express the wish that they would like to help other people, even if there is no benefit for themselves. That shows a tremendous amount of grace."

Willard Daggett, Jr., M.D., cardiac surgeon



Fighting AIDS

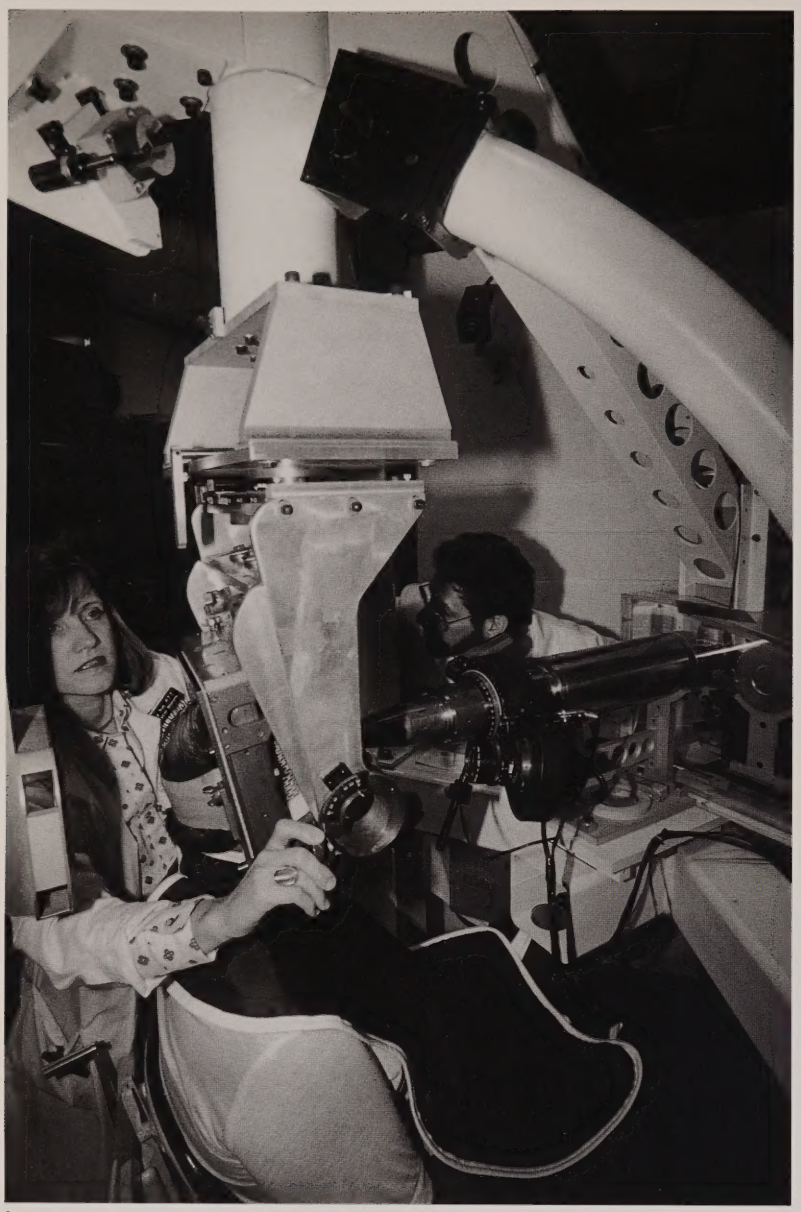
One of the reasons the HIV virus is so difficult to combat is that AZT, the drug now used most widely to slow the virus's growth, becomes less effective over time. In the laboratory, researchers have found that a combined drug therapy consisting of AZT and the new drugs DDI or DDDC may help prevent the virus from becoming resistant to treatment.

A clinical trial to test this finding is one of many projects being conducted by a consortium of researchers from Harvard University and affiliated teaching hospitals, led by Martin Hirsch, M.D., of the MGH Infectious Disease Unit.

JUST LAST YEAR, Bill Franklin retired at age 45 from his job as an insurance agent. Diagnosed with acquired immune deficiency syndrome five and a half years ago, fighting the disease was sapping all his energy. Now he volunteers as the treasurer of the Boston Living Center, a drop-in center for people with AIDS. He considers himself lucky that he has received all of his care as an outpatient. Recently, he asked his MGH physician if he could participate in the clinical trial of a combined drug regimen, a trial that is now going on at the MGH and other Boston hospitals.

"I know it's a fatal disease," says Mr. Franklin, "but if you want to control your own destiny, you have to know what options are available. I try to keep on top of the current therapies because I want to live the highest quality life possible. Sometimes it seems like the medications make you feel sicker than the disease, but if that's what it takes, I'll do it."

In a hospital, the knowledge gained through research must ultimately return to its inspiration: the patient. In some cases, an experimental treatment represents a patient's last hope. In others, a new technique offers the best chance to regain a full and active life. In still others, a new development in technology may help smooth the path to recovery. But in all cases, the usefulness of a new therapy or technology can only be determined after it has been tested by patients. And only the determination of patients like Bill Franklin makes such testing possible.



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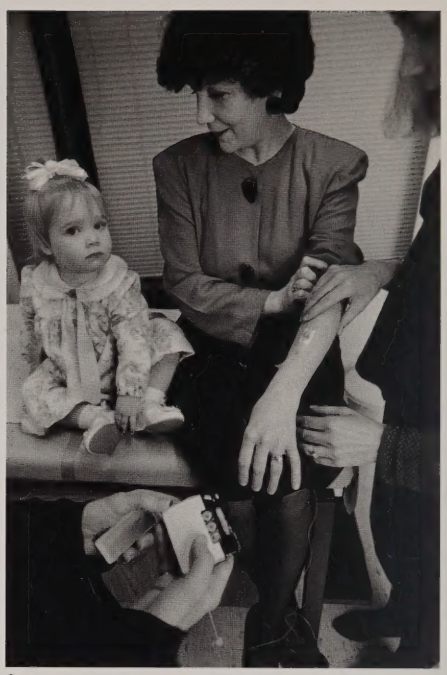

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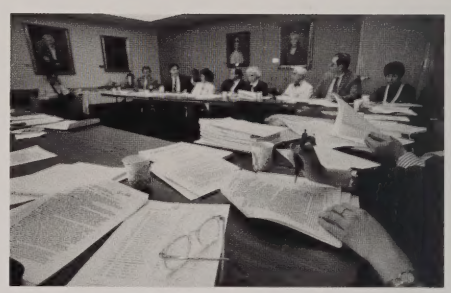


3

1
Proton Beam Therapy

"With proton beams we can deliver high dosages of radiation to a tumor without harming surrounding tissue," says Herman Suit, M.D., chief of radiation oncology. In an MGH and Massachusetts Eye and Ear Infirmary program, over 95 percent of patients who receive proton therapy for tumors of the eye have no recurrence of cancer five years later. Proton beams have also proven highly effective in treating malignant tumors at the base of the skull and in eliminating arteriovenous malformations in the brain.

2
Infertility Treatment

Mary Daley was told she might not be able to have children. She has a disorder called hypothalmic amenorrhea — her body does not produce gonadotropin releasing hormone, which triggers the release of eggs from the ovaries.

Then she joined a study by the MGH Reproductive Endocrine Laboratory to help women with this disorder become fertile. For two months she wore a small pump and a catheter that attached to her arm. The pump released the hormone in pulses, mimicking her normal cycle. She became pregnant and nine months later, her daughter Jillian was born.

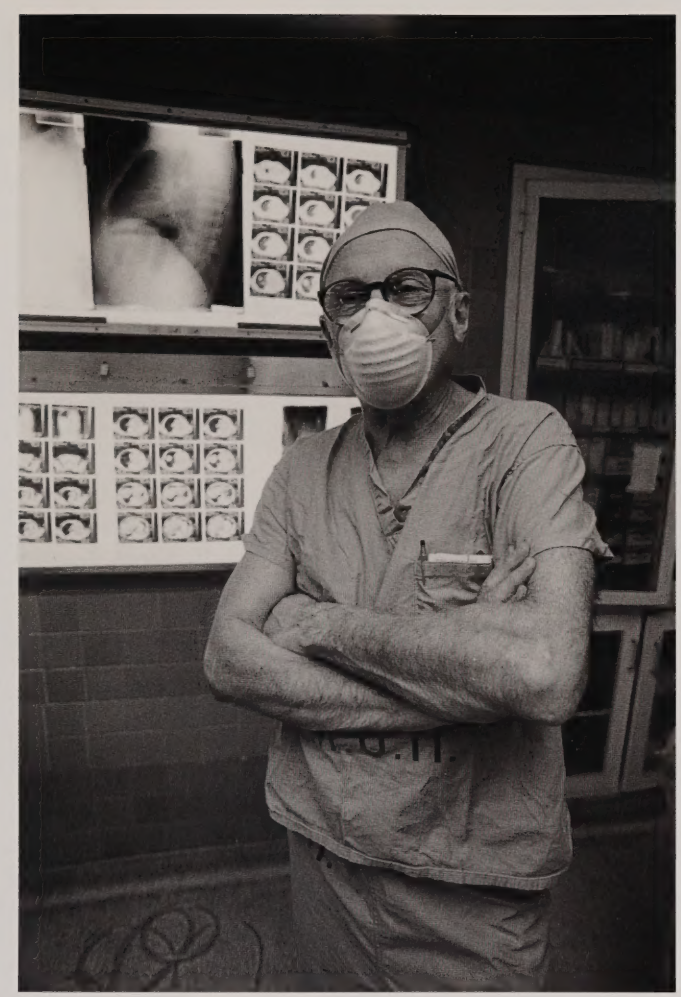
"The success of this treatment represents the culmination of a great deal of basic research, which has rapidly been brought directly into the patient care arena," says William Crowley, M.D., director of the laboratory.

3
Human Studies

The physicians, surgeons, nurses, pharmacists, social workers, and lay people who compose the MGH Subcommittee on Human Studies meet every two weeks to review Hospital studies. They provide researchers with feedback on ways to improve and streamline their projects and ensure that patient rights are respected. In addition, the MGH Research Animal Care Subcommittee ensures that strict guidelines are implemented to protect the rights of animals.

"Clinician-researchers are bridge tenders. They treat patients with the best therapies available; then they ask the scientist to help find a better solution. They also say to the scientist, 'help me bring this scientific finding back to the other side of the bridge to treat patients.'"

Henry Mankin, M.D.
Chief of Orthopaedic Surgery



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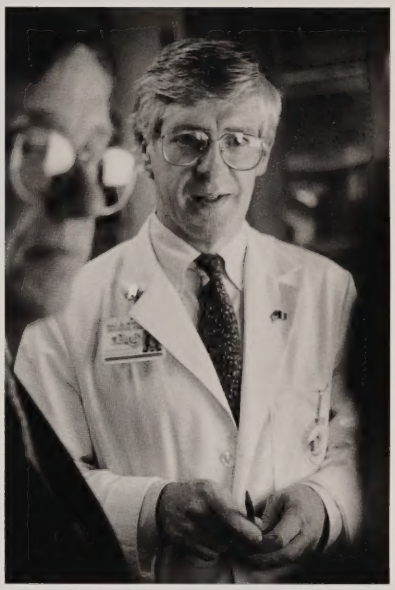


5

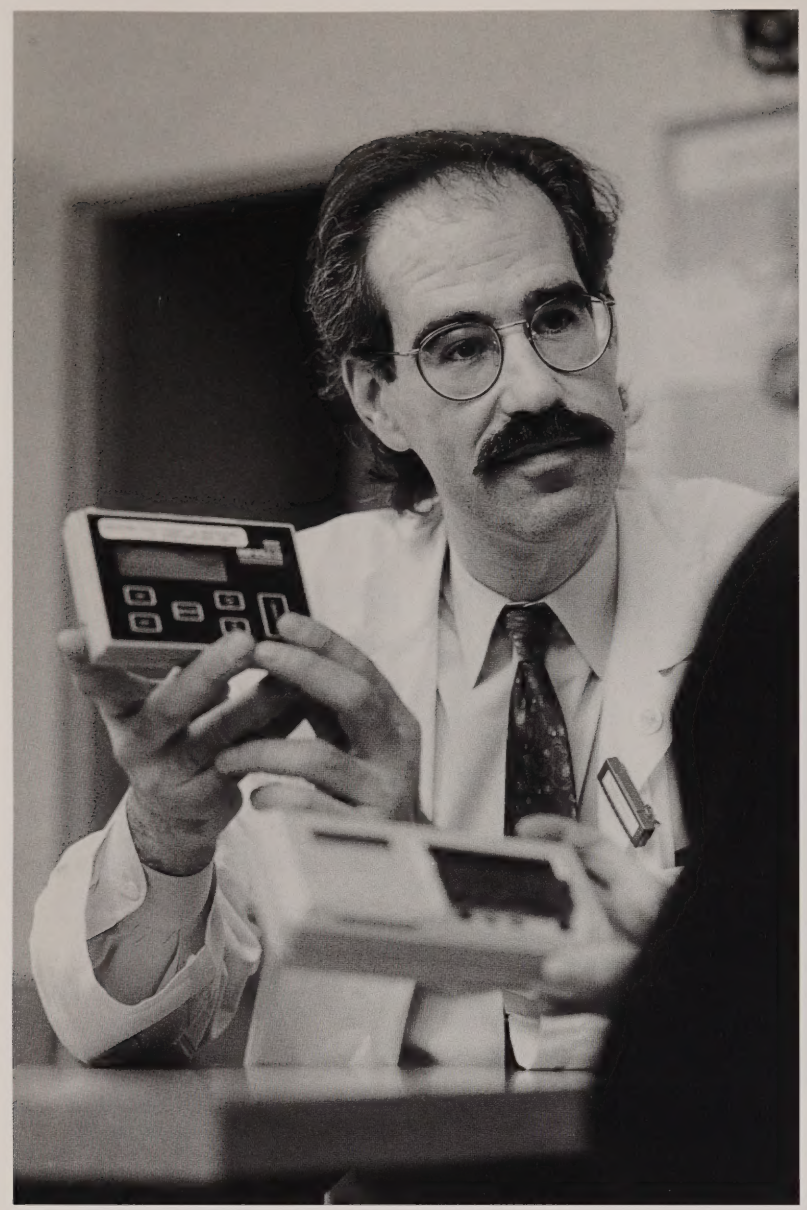
4
Thoracic Surgery

Often, patients with airway problems come to the MGH as a last resort, having been told their case is "impossible." And often, the Thoracic Surgical Unit can offer them relief. "Ever since the unit was created in 1969," explains Hermes C. Grillo, M.D., chief of the unit, "we have sought to look at these problems from a broad point of view." As new surgical techniques are developed in the laboratory and successfully applied, clinical observations are fed back to the laboratory. This process has yielded advancements in treating tumors and obstructions of the trachea and bronchi that have made the unit a leading international center for the treatment of airway problems.

Among other accomplishments, the unit developed a method that can prevent narrowing of the trachea, once a frequent complication of breathing on a respirator. In collaboration with radiotherapy and medical oncology, the unit is seeking to improve the long-term results of treatments for cancers of the lung and esophagus. And they are continuing research that preceded the Hospital's new clinical lung transplantation program.

5
Combined Treatment for Bladder Cancer

Invasive bladder cancer is a virulent disease, often requiring the immediate removal of the entire bladder. In a clinical trial involving urology, radiation medicine, and medical oncology, MGH physicians are studying a new way of treating bladder cancer. After removing the tumor through the urinary passage, they administer an aggressive course of radiation and chemotherapy. Only if the cancer is still present at the end of treatment is the patient's bladder removed. To date, the study has shown the combined therapy appears to improve patients' chances of survival and, in many cases, enables them to retain their bladders. "The treatment makes sense," says urologist Niall Heney, M.D. "First you excise the tumor and then you give therapy to kill any local or distant microscopic cancer."

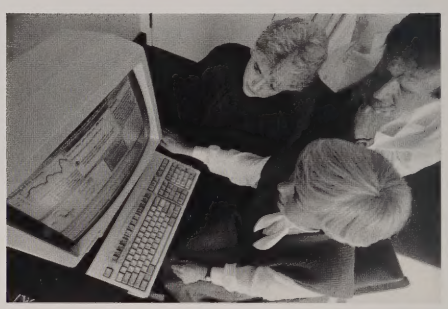


1

"Clinical research is the basis for excellence in clinical practice. We strive for a spirit of inquiry — a constant prodding that calls into question each of our practices, examines it, and either validates, modifies, or discards it. We are interested in research, not for its own sake, but because it builds a body of scientific knowledge that ultimately benefits our patients."

Yvonne Munn, R.N.,
Director of Nursing

2



3

1
Managing Diabetes Complications

With insulin, diabetes patients can enjoy a full life. However, most will experience complications, such as kidney, vascular, and eye disease. In the largest clinical study of diabetes ever conducted, physicians from numerous specialties, nurses, dietitians, technicians, secretaries, and some 1,440 patients from 29 centers are helping to answer one simple question: does maintaining a blood sugar level as close as possible to normal reduce or prevent these complications?

Among the innovative new approaches to treatment being used in the trial are external pumps that release insulin and finger-stick kits that patients use to measure their own glucose — both of which were initially investigated at the MGH, a leader in the study. "Diabetes requires extraordinary patient effort in terms of self management," says David Nathan, M.D., director of the Diabetes Research Center. "Our patients must be creative, flexible, and smart. We see them as research partners."

2
Helping Patient Decision-making

For a patient, trying to understand and choose between the different treatments available can be confusing. MGH General Internal Medicine Chief Albert Mulley, Jr., M.D., collaborating with MGH physician Michael Barry, M.D., as well as colleagues at Dartmouth Medical School, has developed a number of interactive video programs that provide patients with research data specific to their demographic group on the probable risks and outcomes of various treatments. The videos also present other patients who have had alternative treatments discussing their experiences. This new approach enables patients to absorb information at their own pace and helps them take a more informed role in selecting the treatment that is best for them. And by following up with patients who use the video, researchers can obtain comprehensive data on patients' outcomes — thereby helping to fill important gaps in the medical literature. A program that helps patients choose treatments for prostate disease is currently available. Programs dealing with high blood pressure, back pain, breast cancer, and heart disease are being developed.

4

3
Clinical Computers

Today, a tremendous amount of information is available to clinicians, yet increasingly the time they have for collecting this material is constrained. To help make information readily available to clinicians as they develop care plans for their patients, G. Octo Barnett, M.D., Joan Fitzmaurice, R.N., Ph.D., and Rita Zielstorff, R.N., M.S.N, of the MGH Laboratory of Computer Science and the Department of Nursing are developing a computer-based decision support system.

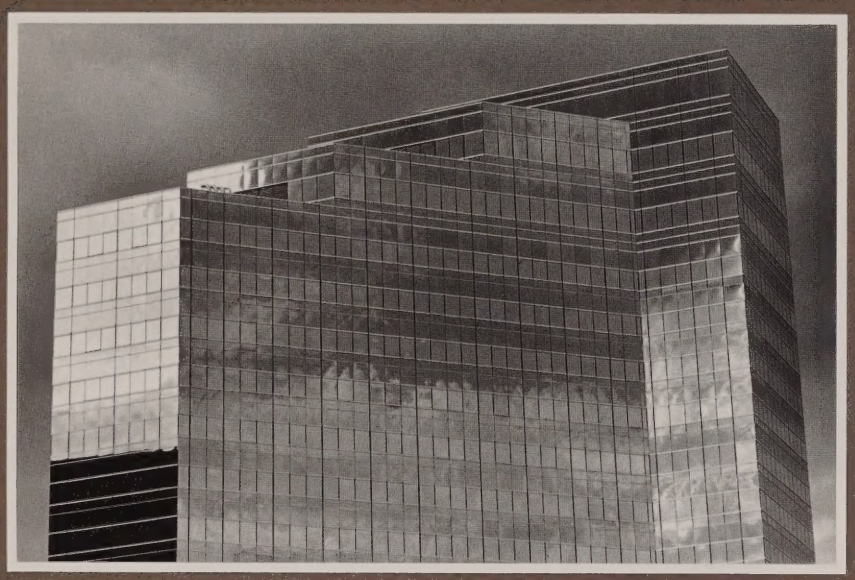
In essence, the system places an easy-to-access library of clinical textbooks and journals, combined with a panel of experts, at the fingertips of clinicians working on the patient care unit. "We plan to use the system as both a resource for consultations and for teaching," says Dr. Fitzmaurice.

4
Protecting Heart Muscle During Surgery

During open heart surgery, physicians circulate a solution through the heart that temporarily stops it from beating. Recently, MGH cardiac surgeons, led by Willard Daggett, M.D., discovered that by dissolving oxygen in this "cardioplegic" solution, they could protect the heart from damage caused by receiving too little oxygen. They also add red blood cells to this solution because they cause the blood vessels to open, allowing more of the solution to enter heart muscle cells.

"This technique is proving to be a tremendous success," says Dr. Daggett. "Knowing the heart is protected takes the rush out of the operation, giving us time to use very exacting surgical technique. And afterwards, patients recover much more rapidly."

Progress



A Big Step Forward for the "New" MGH

The Campaign to Rebuild the MGH eclipsed its $169 million goal with a $10 million donation from the Boston-based Ellison Foundation, established by industrialist Eben Ellison, Sr. The final total of $175.4 million is one of the largest sums ever raised in a hospital capital campaign.

In September, the first patients were admitted to the new 24-story inpatient tower, named the Ellison Building in recognition of the family's contributions to the Hospital. The Ellison Building, together with a second 15-story tower due for completion in 1994, will replace a total of 587 beds in outdated MGH buildings. Campaign funds have also supported the renovation of the White and Bigelow inpatient buildings, the construction of the Wang Ambulatory Care Center and the Wellman Research Building, and the establishment of an endowment for the MGH Institute of Health Professions.

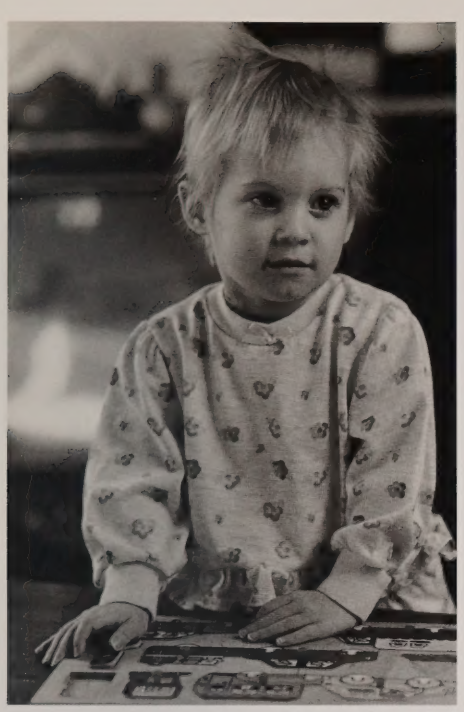
The Campaign received about three-quarters of its support from individuals, many of whom were former patients. The balance of funds was contributed by corporations and foundations. Hospital Board Chairman W. Nicholas Thorndike noted, "It is truly gratifying to know that so many people and organizations are committed to the future of this institution. The MGH community will always be grateful for their support."

A Tradition Maintained

Every three years, the MGH presents its most prestigious award, the Warren Triennial Prize, to outstanding investigators in biomedical science. Since 1953, 12 of 26 winners of this award have gone on to win the Nobel Prize. In October 1989, the "tradition" was observed with new force: Thomas R. Cech, Ph.D., of the University of Colorado, received the Nobel Prize in Chemistry less than 24 hours after he was awarded the Warren Triennial Prize.

Dr. Cech won the Nobel for showing that RNA can serve as an enzyme as well as a carrier of the genetic code.

Also awarded the Warren Prize was Joan A. Steitz, Ph.D., of Yale University. She has advanced science's understanding of how RNA forms.



Maureen Campbell

A Miraculous Recovery

In February, New Hampshire residents Tom and Cathy Campbell brought their 13-month-old daughter, Maureen, to the MGH after she suffered a severe reaction to a standard antibiotic prescribed for an ear infection. The reaction evolved into Adult Respiratory Distress Syndrome, a highly unusual and life-threatening illness.

"We put Maureen on a ventilator," said MGH pediatric surgeon Dan Ryan, M.D., "but her condition steadily worsened. It became obvious that unless we did something drastic, Maureen would die."

Dr. Ryan and his associates put her on an extracorporeal membrane oxygenator (ECMO), a device that temporarily takes over for a patient's lungs to give them a chance to rest and, possibly, recover. But at the end of three weeks, the conventional cut-off point for ECMO, her lungs showed no significant signs of healing.

Because there was no other alternative, her physicians kept her on the artificial lung. Then, slowly, her lungs began to improve. After a record 34 days, she began to develop complications and her physicians decided she had to be taken off the machine.

Subsequently, in what one doctor called "probably the most amazing thing I've ever seen," Maureen's lungs began to heal. Two months later, after a complete recovery, her parents took her home.

Maureen Campbell's seemingly miraculous recovery suggests that ECMO, long considered appropriate only for use with full-term newborns, may have significant potential to help treat respiratory distress in children.

Among the Nation's Best

In April, a *U.S. News and World Report* survey ranked the MGH among the top hospitals in the nation. The magazine also featured a special photo essay on the MGH which noted, "This venerable hospital, among the nation's best, draws the most talented young clinicians and researchers from around the country and the world, many of whom stay on and lure the next generation."

New Child Care Center

The MGH has turned a Charlestown Navy Yard building once reserved for ship captains into a haven for the young children of its employees.

The Captain's Quarters, completely renovated with many of its 19th century details preserved, now houses the MGH Children's Center.

Opened in early 1990, the center has a staff of 25 and is the day-time home for 70 preschoolers. Richard Montgomery, assistant director of human resources, says the center is part of ongoing efforts to make sure the MGH remains "a great place to work."

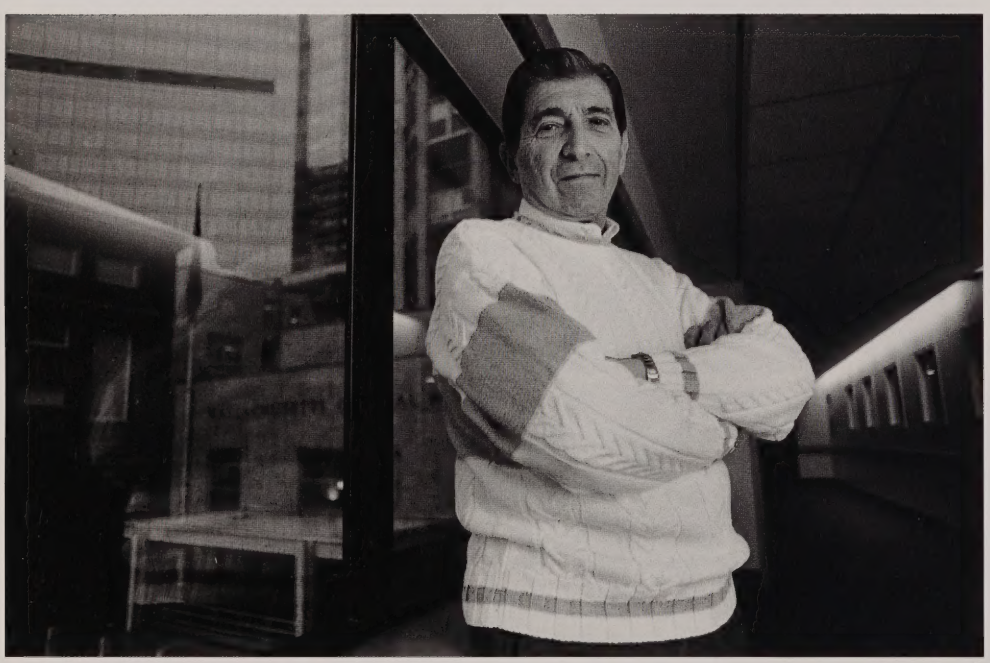
Aid for the Heart

Leon Frank, 60, of Needham, Mass., is the first MGH patient to receive a new kind of heart-assist device that combines the features of a pacemaker and a defibrillator. The device is designed to restore a regular heartbeat in patients with life-threatening heart rhythm disturbances.

In the case of tachycardia, or overly rapid beating, it is programmed to first act as a pacemaker, reports Jeremy Ruskin, M.D., head of the Hospital's Arrhythmia Service. If this fails to have an effect, the system delivers a mild shock to restore a normal beat.

Another useful feature, said Ross Brooks M.D., of the Arrhythmia Service, is that the device collects data about its bearer's heartbeat which can be analyzed by the physician.

MGH cardiologists and cardiac surgeons have begun implanting the device, called the Ventritex-Cadence system, as part of clinical trials at the MGH and four other U.S. medical centers. An estimated 100,000 Americans are potential beneficiaries of the new system.



Leon Frank

Liver-Biliary-Pancreas Center

Patients with disorders of the liver, pancreas, and related organs often have complex problems that require a multi-disciplinary approach. To coordinate the efforts of more than 60 physicians from seven specialties who provide care to these patients, the Hospital has established the Liver-Biliary-Pancreas Center. The center facilitates patient access to the Hospital — long a world leader in the treatment of these disorders.

The center's creation comes at a time of accelerating advances in treatment. Transplantation, an established treatment for liver disease, is now also being used to treat diabetes, a pancreatic disorder. Physicians treating gallstones have options that include drugs and laser or shock-wave lithotripsy, techniques used to shatter the stones.

Surgeons employing a tiny, telescope-mounted TV camera can also remove a gallbladder with only a few small incisions. Andrew L. Warshaw, M.D., associate chief of surgery, said the new technique "has caused the most dramatic change in surgical practice I've ever seen."

David J. Kamara

First Lung Transplantation

On August 23, the Hospital performed its first lung transplantation, saving the life of a man suffering from severe emphysema.

A team of MGH surgeons operated on David J. Kamara, 52, of Dorchester, Mass., replacing one of his lungs. Formerly a chef, Mr. Kamara had been on oxygen full-time for four months.

Until recently, it was thought patients with emphysema had to have both lungs replaced. The success in replacing just one lung "means we'll be able to help far more people with this operation," said John C. Wain, M.D., surgical director of the MGH Lung Transplantation Program.

The MGH is the only hospital in New England that performs the full spectrum of organ transplants, including the heart, kidneys, liver, pancreas, and bone.

The MGH Physician Referral Service

The MGH Physician Referral Service, which provides a simple, convenient way for patients to obtain appointments with MGH physicians, completed a successful first year.

The service's referral coordinators are trained to listen to patients' needs and help them decide which physician is most appropriate for them. In most cases, an appointment is made during their initial call to the service. Referral coordinators also provide patients with both written and verbal confirmations and inform them of any details they will need to know about their visit.

The service operates a 24-hour-a-day cancellation line and a toll-free line for outside physicians who wish to refer patients.

Saving an Aussie Firefighter's Leg

Last summer, Australian firefighter Laurence Firth, 39, came to the MGH with his wife Wendy and daughter Danielle when a surgeon in Sydney told him it might be his only chance to avoid losing a leg and hip to cancer.

He was treated by Chief of Orthopaedic Surgery Henry Mankin, M.D., a pioneer in allografting, in which the patient's diseased bone is replaced by the bone of a deceased donor. "We removed the tumor, replaced most of the pelvic bone with the allograft, and put in an artificial hip joint," says Dr. Mankin.

Mr. Firth received frequent visits from Boston firefighters — alerted to his plight by his chief in Sydney — and plenty of attention from MGH staff members. "The whole experience has been incredible," said Mr. Firth.

A month after the August 23 operation, Mr. Firth was able to walk out of the Hospital.

New Stroke Treatment

An MGH team, led by Philip Kistler, M.D., Daniel Singer, M.D., and Robert Hughes, M.D., has proven conclusively that small doses of the drug warfarin are effective in preventing strokes caused by atrial fibrillation — a syndrome in which the upper two chambers of the heart quiver instead of pumping properly, thus allowing blood in the chamber to pool and clot. The drug is so effective, researchers project that it could prevent 86 percent of such strokes, which strike about 75,000 Americans each year.

New Help for Infertility and the Problems of Menopause

Early in 1990, Vincent Memorial Hospital, the gynecologic service of the MGH, established a unit to serve women with menopausal problems and couples affected by infertility.

Osteoporosis, the thinning of bone, is a major concern of the Vincent Gynecology Infertility and Menopause Unit, particularly through the work of Veronica Ravnikar, M.D., the unit's director.

The unit will also use a range of techniques to overcome infertility, including the use of laser laparoscopy. The unit plans to establish a donor sperm bank and an *in vitro* fertilization program.

"We intend to do our very best to help couples have the children they desire," said Isaac Schiff, M.D., chief of the Vincent Memorial Gynecology Service.

New Additions

Two new additions to the MGH campus now complement the historic Resident Physicians' House at the head of the entrance drive to the Hospital — the Trustees' House and the Physicians' Office Building.

"Fresh," "modern," and "beautiful" were among the words that *Boston Globe* architecture critic Robert Campbell used to describe the buildings, while the Boston Preservation Alliance noted that they stand out among the city's recent new structures in terms of their "harmony with Boston's built environment." The buildings were designed by architects Thomson French & Associates.

The Trustees' House includes administration offices and a library named in honor of Mrs. R. Morton Claflin for her many contributions to the Hospital. The Physicians' Office Building includes a pharmacy and other stores on its first floor, with the remainder being devoted to MGH physicians' private offices.

Progress on Parkinson's

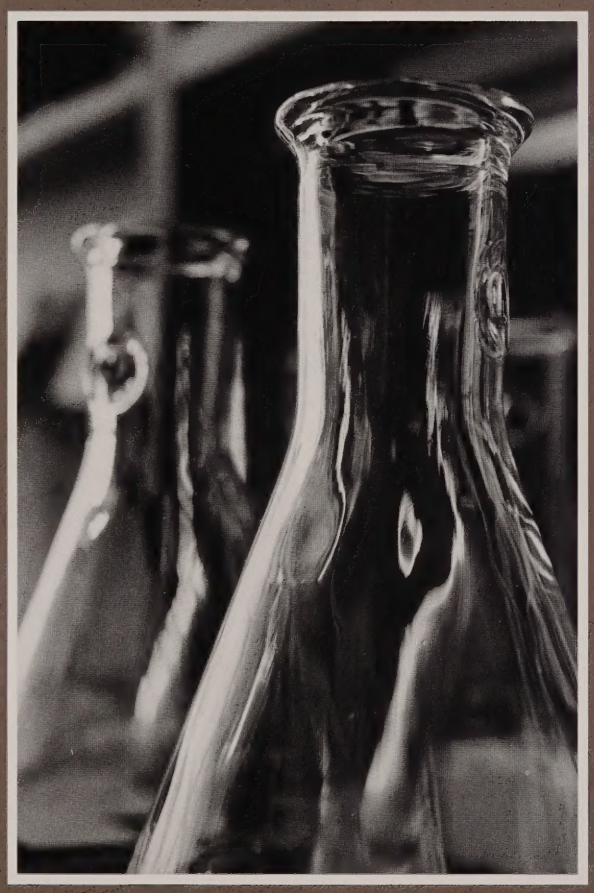
In November 1989, MGH physicians and patients helped show that a new drug slows the progression of Parkinson's disease, a progressive neurological illness that afflicts hundreds of thousands of Americans.

The MGH is one of 30 hospitals taking part in a clinical trial of patients in the early stage of the disease. The trial showed that

MGH members of the Parkinson's research study

the drug selegiline "delays the onset of serious and debilitating features of Parkinson's disease," reported J. Stephen Fink, M.D., the principal investigator of the MGH portion of the study. The results were so striking that the trial has been modified so that all participating patients can receive the medication.

Promise



Support for Cardiovascular Research

In February 1990, the Hospital established a new Cardiovascular Research Center (CVRC), in part with funding from the Bristol-Myers Squibb Co.

From its base in the Hospital's Charlestown laboratories, the CVRC will carry out basic research into cardiovascular disease, with an emphasis on molecular, cellular, and genetic approaches. As in other such agreements, center scientists set their own research agendas, while the company will have licensing rights to any clinically useful developments.

The CVRC is headed by Mark Fishman, M.D., chief of the MGH Medical Services' Developmental Biology Laboratory.

Silent Heart Attacks

"Silent" heart attacks, or those with no symptoms, may not be that silent after all, a team of MGH cardiologists and psychiatrists reported in September. Instead, the symptoms may simply be ignored by those affected.

Heart damage discovered in patients who never reported any symptoms had led to estimates that at least 30 percent of all heart attacks are "silent." Researchers have also estimated that about two thirds of patients affected by ischemia — a cutback in blood flow to the heart that is sometimes a warning sign for future attacks — experience no symptoms.

However, many of these attacks "are not truly painless at all, but are denied, downplayed, misinterpreted, or ignored," said cardiologist Kim Eagle, M.D., assistant chief of medicine for residency training.

Arthur Barsky, III, M.D., chief of the MGH Primary Care Psychiatry Unit and the report's lead author, noted that studies of many diseases have found little correlation between the symptoms patients report and the severity — or, in some cases, even the presence — of disease.

Center for Diagnostic Imaging

In July, the MGH established a center dedicated to the improvement of diagnostic imaging. The center was made possible by a pledge of more than $18 million over six years from Sterling Drug, Inc.

The Center for Imaging and Pharmaceutical Research (CIPR) in the Hospital's Charlestown laboratories will develop pharmaceuticals for use in diagnostic procedures such as magnetic resonance imaging (MRI), positron emission tomography (PET), and ultrasonography.

In describing the rationale for the center, James Thrall, M.D., MGH radiologist-in-chief, said that "imaging technology is becoming an increasingly powerful and cost-effective tool for medical diagnosis and treatment."

Sterling will have the right to license any pharmaceuticals the center's staff develops.

Alzheimer's Is Not Just One Disease

The first conclusive evidence that Alzheimer's disease is actually a group of disorders was reported in September by an international team of 60 researchers led by an MGH geneticist.

Earlier, the MGH researchers in the group had reported that some forms of the fatal brain ailment are associated with a genetic defect on chromosome 21. The more recent study covered two groups of patients — one afflicted before age 65, the other after 65 — and revealed that only a subset of the under-65 group had the chromosome 21 defect.

Rudolph Tanzi, Ph.D., an assistant in genetics at the MGH and head of the study, said he and his associates are trying to pin down whether the genetic problem in that subset affects a gene for a so-called amyloid precursor. Amyloid is an abnormal protein deposit widely present in the brains of Alzheimer's patients.

As for the other cases, he said they may be caused by other types of genetic defects or by a mix of genetic and nongenetic factors. In any event, said Dr. Tanzi, the fact that Alzheimer's is a group of disorders calls for "a much broader scope of investigation" into the condition.

Alzheimer's affects an estimated three to five million Americans, most of them elderly.

Diagnosing Alzheimer's

Currently, Alzheimer's disease can only be definitively diagnosed after a patient dies. MGH physicians and scientists have begun working with colleagues from other hospitals, the academic community, and industry to develop a method for diagnosing this disease.

The effort is being funded by the Mallinckrodt Medical unit of IMCERA, formerly known as the International Minerals and Chemical Corporation.

Charles Marotta, M.D., Ph.D., director of the Hospital's Neurobiology Laboratory, heads the project at the MGH. He and his colleagues will use monoclonal antibodies developed at McLean Hospital and the MGH, which attach to a protein found in the brains of Alzheimer's patients. Researchers hope to locate the antibody, and thus the protein, using radiolabeling technology from NeoRx Corporation of Seattle.

Cystic Fibrosis Program

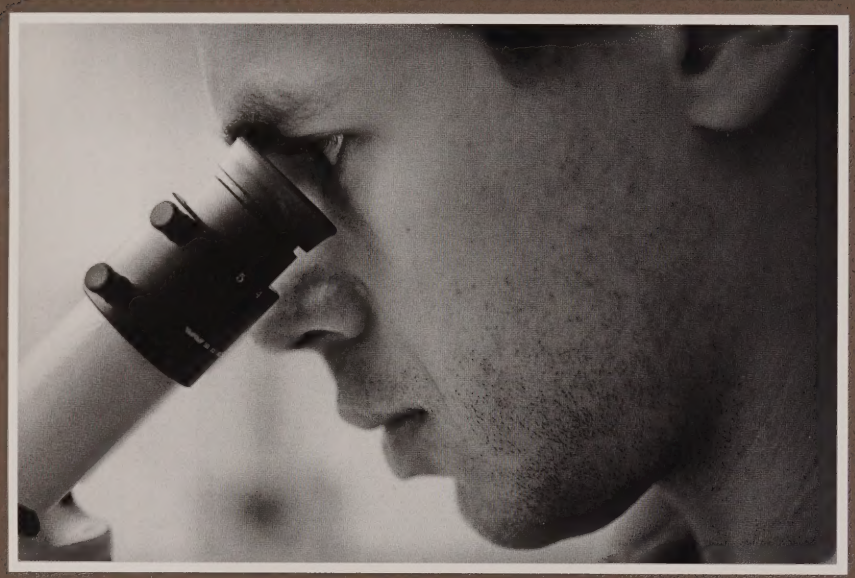
The MGH launched New England's first research program aimed at improving treatments for cystic fibrosis, one of the most common hereditary diseases.

The Cystic Fibrosis Foundation funded the program with a $1.3 million, three-year grant. Robert J. Beall, M.D., the foundation's executive vice president, said it is hoped the research "will help lead, first, to the development of new therapies to extend the lives of CF patients and, ultimately, to a cure."

The program "is dedicated to the memory of Joey O'Donnell, an MGH cystic fibrosis patient who died in 1986 at age 12," noted Dennis Ausiello, M.D., chief of the Hospital's Renal Unit and director of the program.

Cystic fibrosis, which affects roughly one in 2,500 newborns, leads to the clogging of airways and other passageways in the body.

People



Ronald S. Newbower, Ph.D.

New Head of Research

In February, the MGH named Ronald S. Newbower, Ph.D., vice president for research and technology affairs, giving him major responsibility for a research program that now exceeds $100 million a year.

Dr. Newbower said one of his key goals is to continue building successful links with industrial sponsors. The Hospital, he noted, is a "pioneer in developing industrial support agreements that preserve academic freedom."

A graduate of Harvard and MIT, Dr. Newbower came to the MGH in 1971. In the early 1980s, he became head of the Department of Biomedical Engineering and in 1987 was named director of technology development.

The new research chief succeeded Ronald W. Lamont-Havers, M.D., who is now deputy head of the MGH-Harvard Cutaneous Biology Research Center and senior consultant for Research Affairs.

Ether Day Recognition

The MGH celebrates the long-standing service of its employees on Ether Day, which commerates the first public demonstration of the use of ether as an anesthetic. In November 1989, more than 900 employees — the most ever honored — were recognized for five, 10, 20, 30, 40, 50, and 60 years of service.

Honors for MGH Nurses

In October 1989, six MGH nurses were winners in a contest sponsored by the publications *American Journal of Nursing* and *Geriatric Nursing* for their accounts of how special efforts in caring improved patients' lives.

Bethany Accomando Nasser, R.N., an MGH staff nurse, was honored for her account of how she won the trust of an abusive patient suffering from AIDS.

Besides Mrs. Nasser, the other MGH finalists were registered nurses Sharon Blakeney, Hope Martel, Susan Noska, Deborah Thomas, and Susan Warchel. Eight other nurses from around the country were recognized.

Bethany Accomando Nasser, R.N.

Earle Chapman, M.D.

Earle Chapman, M.D., a pioneer in the field of nuclear medicine and a 60-year veteran of the MGH, died in May at the age of 86.

Joining the Hospital as an intern in 1929, in 1943 Dr. Chapman took over a research effort aimed at exploring the use of radioactive iodine to treat hyperthyroidism. Working with MIT scientists, he sought more effective forms of the agent and studied its effect on patients. Ultimately, these studies helped usher in the field of nuclear medicine. In the mid-1970s, both the Society of Nuclear Medicine and the American Thyroid Association honored Dr. Chapman for his pioneering role in the field.

Charles E. Huggins, M.D.

Charles E. Huggins, M.D., who devised the first practical method for the long-term freezing of blood, died in April at age 60.

Having joined the MGH in 1953, Dr. Huggins did his pioneering work on blood storage in the 1960s. He also developed a device called a cytoglomerator to store and process the frozen cells. Hospitals across the country used the device until it was replaced by automated equipment in the 1980s.

Dr. Huggins joined the MGH Blood Transfusion Service in 1965, serving as its director for 17 years. He also created an apheresis unit — useful in treating disorders of the blood, nerves, and kidneys — at the Hospital.

Farahe Maloof, M.D.

Farahe Maloof, M.D., former chief of the Thyroid Unit at the MGH, died in July at the age of 69.

Dr. Maloof completed his residency at the Hospital after serving as an intern at the U.S. Naval Hospital in St. Albans, N.Y. He was named head of the Thyroid Unit in 1966 and held the post until 1980.

Dr. Maloof was a pioneer in the use of radioactive iodine therapy for thyroid cancer. He also carried out important studies of thyroid peroxidase, the enzyme that controls the output of thyroid hormone.

George L. Nardi, M.D.

In December 1989, George L. Nardi, M.D., an internationally renowned MGH surgeon and an expert on pancreatic diseases, died at age 66.

Dr. Nardi, who joined the Hospital as an intern in 1944, had a career marked by a number of milestones in both research and patient care. He identified the link between an inflamed pancreas and overactivity in the parathyroid gland. He was the first MGH surgeon to use a colon segment to replace a cancerous portion of the esophagus, and he performed the Hospital's first emergency endarterectomy, an operation to remove the buildup of fatty tissues in arteries.

In addition, the surgeon pioneered in the use of intraoperative radiation for cancer of the pancreas — a procedure in which a tumor is directly exposed to X rays during surgery.

Howard Ulfelder, M.D.

An internationally known gynecologist and cancer specialist, Howard Ulfelder, M.D., died in April at age 78.

A surgeon who came to the MGH as an intern in 1937, Dr. Ulfelder discovered the link between the drug diethylstilbestrol (DES), given to women at high risk for miscarried pregnancies, and vaginal cancer in their daughters. He and MGH colleagues reported the link in 1971. The U.S. surgeon general subsequently called for a ban on the drug's use during pregnancy.

Dr. Ulfelder served as chief of the Vincent Memorial Hospital, the MGH's gynecology service, for 21 years, and held the Harvard Medical School chair named for his predecessor at the Vincent, Dr. Joe V. Meigs.

The General Hospital Corporation

Excerpts from audited financial statements (in thousands of dollars)

Income

	1990*	1989
From patient care	$497,225	$448,322
less contractual allowance and uncompensated care	101,861	108,077
	395,364	340,245
Revenue for direct research costs	85,778	86,529
Other income and cost recoveries	57,693	49,330
Total Operating Revenue	**$538,835**	**$476,104**

Expenses

For operating expenses:		
Salaries and related compensation	$272,574	$256,290
Supplies, expenses, depreciation	180,014	149,047
	452,588	405,337
Research and other specific expenses	85,778	86,529
Total Operating Expenses	**$538,366**	**$491,866**
less total operating revenue	538,835	476,104
Surplus (Loss) from operations before adjustments	469	(15,762)
Adjustment for third party payors, change in accounting method, and transfers to restricted funds	2,878	9,570
Non-operating income	3,110	3,420
Surplus (Loss)	**$6,457**	**($2,772)**

*Year ending September 30, 1990

The Hospital's Dollar

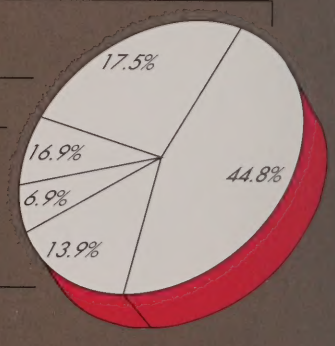
Diagnostic and therapeutic services:
House staff, professional staff, drugs, supplies, etc.

Nursing care

Plant and equipment:
Depreciation, interest, energy, telephone, maintenance, rent

Room and board services:
Food, laundry, security, housekeeping

Administrative services:
Computer, accounting, administrative salaries, etc.



MGH Facts and Figures

Beds	1,081	Clinical fellows	270
Number of admissions	35,019	Residents	470
Number of ambulatory visits	514,895	Research fellows	504
Inpatient surgery	19,239	RNs	2,285
Emergency department visits (main campus)	65,043	LPNs	82
Day surgery	7,863	Nursing assistants	147
Active staff	1,954	Volunteers	1,051
		Employees	9,584

THE MASSACHUSETTS GENERAL HOSPITAL has evolved over the last decade to encompass three hospitals, a degree-granting graduate school, and affiliated medical enterprises. The research program you have read about in this report is the largest of any general hospital in the United States, but it is only a portion of the total MGH community.

The MGH encompasses the General Hospital itself, the McLean Hospital, the Spaulding Rehabilitation Hospital, the MGH Institute of Health Professions, the Professional Services Corporation, and the Health Services Corporation.

Last year, we managed nearly three-quarters of a million patient visits on our main campuses and in our community-based health clinics. We conducted hundreds of research programs and helped educate thousands of medical school students, master's degree candidates, residents, fellows, technicians, and other professionals.

This enterprise is indeed vast. And yet, at its core is a simply defined mission: to provide the sick and injured with the best care possible and to help ensure that future generations receive even better care.

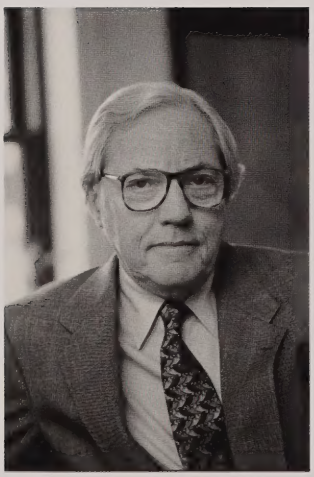
It is worth noting that in a medical era characterized by bewildering complexity, revolutionary scientific advancement, and growing fiscal pressures, the mission of the MGH remains unchanged from that which was first articulated 180 years ago. The soul of this large community is expressed in daily acts of care, conducted with gentleness and compassion, buttressed by state-of-the-art technology, informed by all available knowledge, and stimulated by the desire to enhance, through research, medicine's power to heal.

Those of us responsible for sustaining the MGH must never lose sight of the essence of the Hospital's mission nor the unique importance of its role.

W. Nicholas Thorndike

IN THE PRECEDING PAGES of this report you have read of a wide variety of research endeavors being undertaken at the General Hospital. At a round table discussion sponsored by the New England Board of Higher Education, I explained why I believe an academic medical center such as ours is an ideal environment for research and scholarly inquiry:

> The first step in developing a good biomedical research project is to be able to ask the right questions, to have the right problem to work on. More often than not, what identifies the right problem is a patient presenting medical staff with something intriguing, different, and challenging. The patient prompts a series of questions being asked. Ultimately, these questions translate into research programs and hopefully, in time, often through some very circuitous and labyrinthian route, the loop is closed — perhaps not to the benefit of the same patient, but to similar patients who benefit from a new advance in diagnosis or treatment.

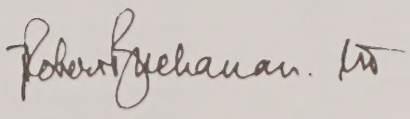


At the General Hospital, the pursuit of new knowledge through research engages the creative energies of more than 4,000 people (2,500 full time equivalents), occupies some 780,000 square feet of highly specialized space, and represents annual expenditures of $125 millions. In the aggregate, the funding of research at the Harvard Medical School and its principal affiliated hospitals is approximately $425 millions. In 1985 (the last year for

which such data are available), the portion funded by Federal agencies was $78 per Massachusetts resident or $10 more per citizen of the Commonwealth than any other state. Clearly, biomedical research attracts substantial resources to our community from outside its boundaries while offering business opportunities to develop new goods and services based on discoveries from our laboratories.

It is important to note that while our research programs are complimentary to our basic patient care mission and our related commitment to education and training, they are funded by gifts and grants from government and the private sector specifically designated for the support of research. Contrary to conventional wisdom, research is not significantly cross-subsidized by patient care revenues nor is the converse true.

It is my hope that this report will have enhanced and solidified your appreciation of research by illuminating its potential contributions to the improvement of patient care and the development of more effective care givers. Moreover, I hope you will have gained a better appreciation for the current contributions of biomedical research and for potential expansion of those contributions to the health of our fellows and to the economic welfare of the Commonwealth and its citizens.



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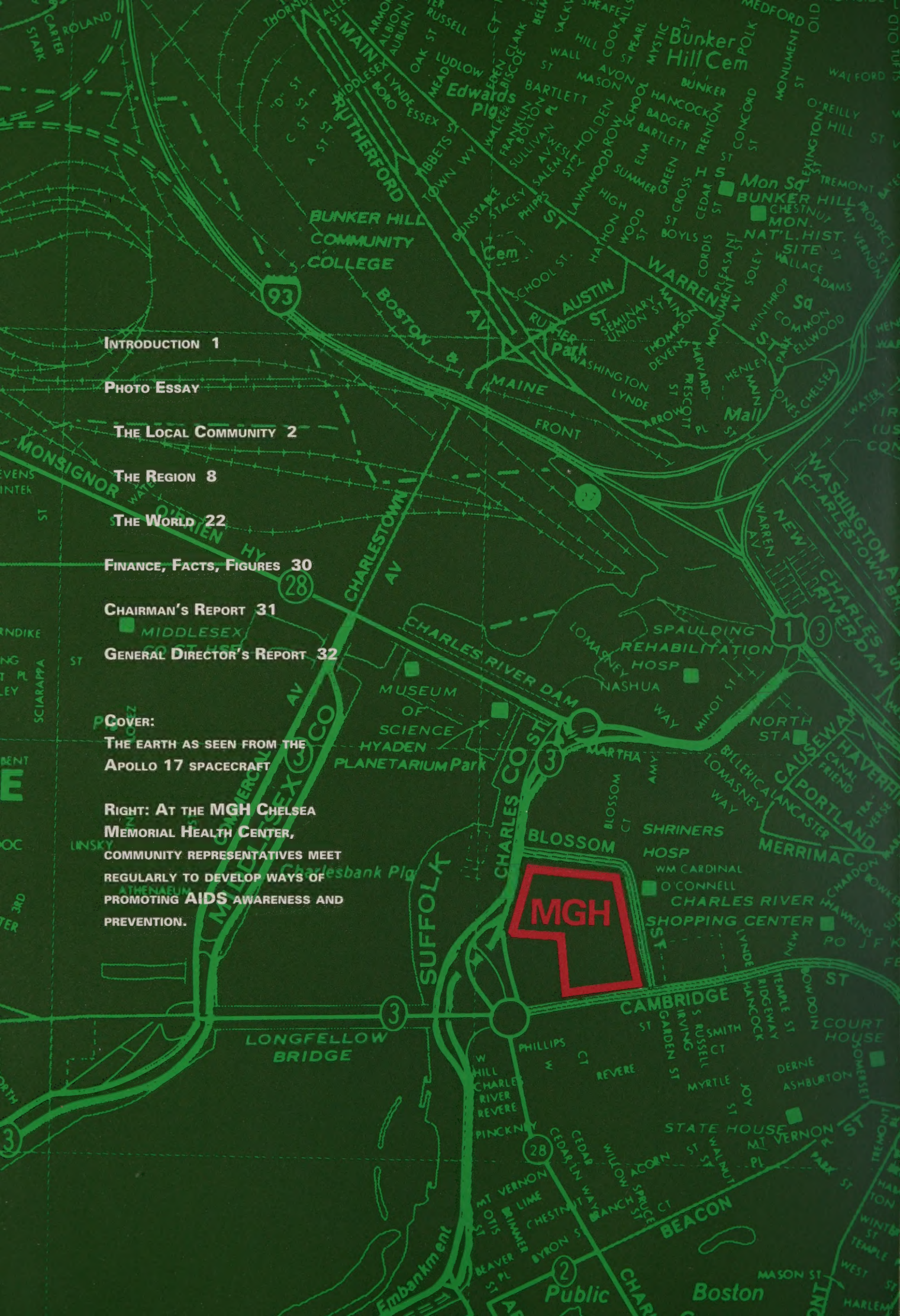
Report of the General Hospital

Massachusetts General Hospital 1991



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Cover:
The earth as seen from the Apollo 17 spacecraft

Right: At the MGH Chelsea Memorial Health Center, community representatives meet regularly to develop ways of promoting AIDS awareness and prevention.

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THE Massachusetts General Hospital is many things to many people — a community hospital, a regional referral center, a world renowned tertiary-care center, an academic institution, a research center.

In fulfilling these various roles, the MGH reaches out to individuals and institutions across the city, throughout the country, and around the globe. In this Annual Report, we hope to give you a sense of these connections.

For in expanding the walls of the hospital, MGH staff have developed ties that are often surprising in their breadth, depth, and variety. While the initial impetus is to help others, at the same time, these connections contribute to the vitality of the institution, often causing the staff of the MGH to look at what they do in a new way. In sharing their expertise, caregivers and investigators bring back new insights and understanding. A continuous loop of giving and receiving begins, whether the focus is patient care, education, or research.

A continuous loop of giving and receiving begins, whether the focus is patient care, education, or research.

Ultimately, however, these connections have one simple, greater goal: to provide skilled, effective, compassionate care to patients.

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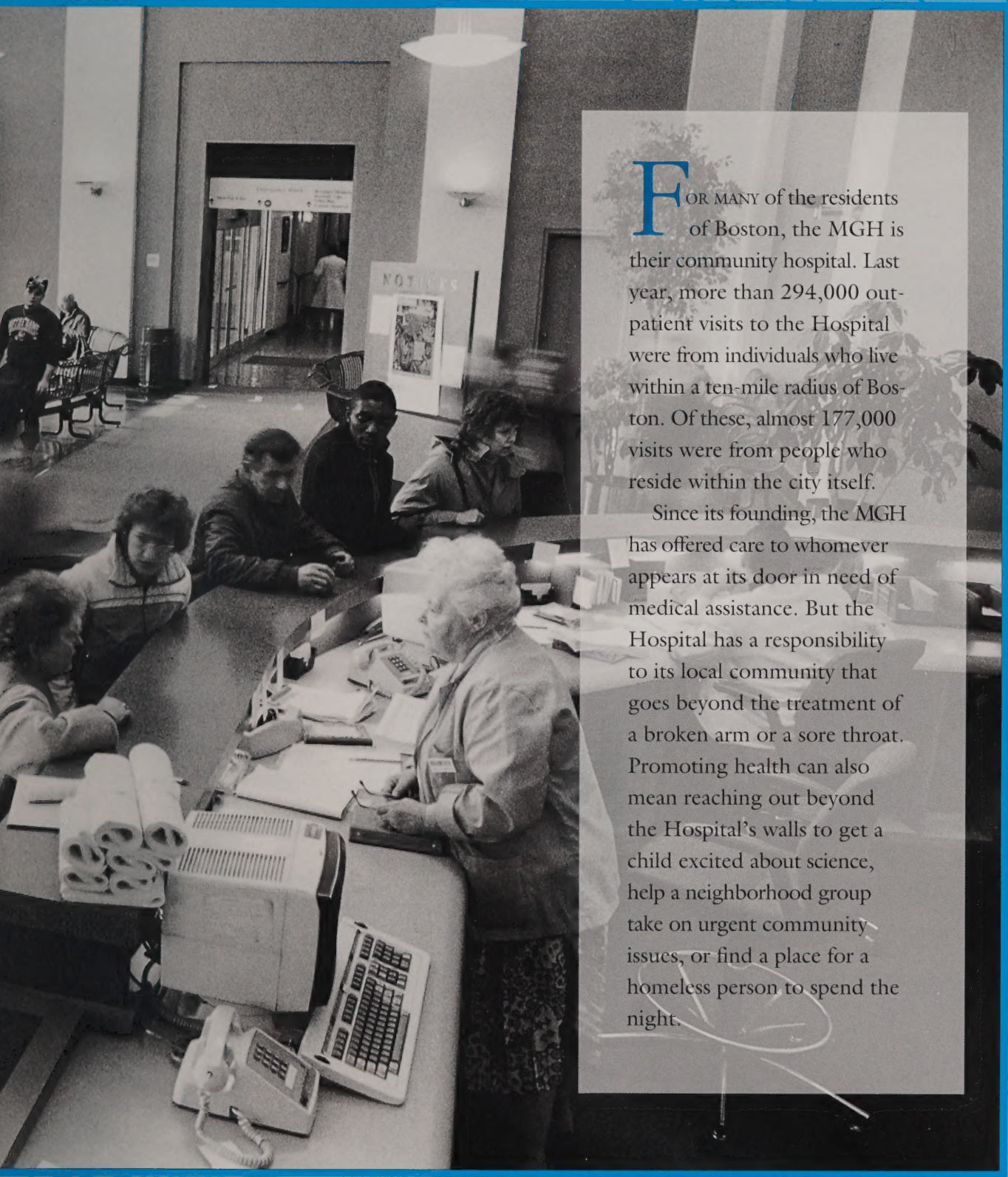
The Local Community



For many of the residents of Boston, the MGH is their community hospital. Last year, more than 294,000 outpatient visits to the Hospital were from individuals who live within a ten-mile radius of Boston. Of these, almost 177,000 visits were from people who reside within the city itself.

Since its founding, the MGH has offered care to whomever appears at its door in need of medical assistance. But the Hospital has a responsibility to its local community that goes beyond the treatment of a broken arm or a sore throat. Promoting health can also mean reaching out beyond the Hospital's walls to get a child excited about science, help a neighborhood group take on urgent community issues, or find a place for a homeless person to spend the night.

BENSO RATTANAVONG
TMILTY SCIENTIST

At first, Benso Rattanavong, a student at the James P. Timilty Middle School in Roxbury, wanted to build a remote control car for his science fair project. But when the 11-year-old and his mentor, Michael Bigby, MD, visited the library, they realized the subject was a bit over their heads. Instead, they decided to find out how a battery works. Using pieces of metal, some chemicals, and a lemon, they made electricity. "The juice is acidic, and it causes the chemical reaction that produces the electrons," Benso explains.

"It was a valuable experience for both of us," says Dr. Bigby, an MGH dermatology researcher. "Science isn't just the experiment itself — it's researching in the library, assembling materials, writing the report. There are setbacks as well as triumphs."

Benso and Dr. Bigby were brought together through one of the five programs that constitute the MGH-Timilty School partnership, led by MGH associate general director Stephen Kauffman and Timilty principal Roger F. Harris. More than 100 Timilty students are connected with volunteer mentors from a wide array of MGH departments. Through their mentors, the students explore the MGH, taking away impressions that could last a lifetime.

"Too often education means abstract, rather than concrete learning," says Mr. Kauffman. "We strive to involve kids in types of creative learning they can apply later on."

The MGH-Timilty Partnership is one of a variety of programs at the Hospital that give urban youths an opportunity to peer into the world of science and medicine, side-by-side with MGH professionals. Another is Project ProTech, which seeks to give an early start to high school students interested in health care careers. This federally funded program integrates the last years of high school and first of college with health care training and jobs at participating hospitals. In 1991, the MGH took 36 ProTech students under its wing.

"These children are the future of our society," notes Kathy Rice, assistant director of Human Resources. "We need to play an active role in educating them."

The Research Apprentice Program, designed and directed by the MGH Research Affairs Office, aims to interest talented minority high school students in biomedical research careers. The program, funded by the federal government, also exposes high school teachers to current scientific research. Last year, 10 students and two of their teachers gained hands-on experience working at the lab benches of various MGH research teams. Their projects ranged from studying sugar transport systems in pig kidney cells to scrutinizing the toxic hazards of smoke inhalation.

Several MGH summer programs, such as the MGH-Timilty partnership's CityCamp, help keep adolescents active, thinking, and away from drugs, alcohol, and street violence.

Patricia Rowell, director of the MGH Volunteer Department, recalls one of 60 teenagers enrolled in the department's High School Career Exploration Program last summer—a slightly off-beat, quiet boy who wore a black leather vest and an earring. "I assigned him to a basic science researcher, but I really wondered if it would work out." Later his mother sent a letter saying it was one of the most meaningful experiences of her son's life.

MGH volunteers give urban youths an opportunity to peer into the world of science and medicine.

Left: Benso Rattanovong works in the Dermatology Research Laboratory with his mentor, Dr. Michael Bigby.

Right: Timilty students tour the MGH Emergency Department.

Previous page: Bustling with activity, the lobby of the White Building is the main entrance to the MGH.

ON AN AVERAGE "road" day, seasoned nurse practitioner Robin Sherman, ANP, hastily downs a cup of coffee at the MGH Chelsea Memorial Health Center, then sets out in her white Ford to begin her home visits for the day.

Each MGH health center brings the services of a large hospital to local neighborhoods.

At one stop, she takes the vital signs of 99-year-old Luigi Mongiello, who refuses to go near a hospital. He clasps her hand and tells her he feels "great." At another, she evaluates Julia Rivera-Vilchez, age 81, an Alzheimer's disease patient with chronic bronchitis who lives with her daughter in an apartment with no telephone. Mid-morning, she nods reassuringly as she holds her stethoscope to the chest of Frances Irene Ford, 88, who is prone to congestive heart failure. Support from the MGH health center helps enable Miss Ford to continue living in the building her family has owned since 1902.

"Some people have a tenacious desire to remain independent until the day they die, and staying in their own homes is how they do it," says Ms. Sherman, who makes up to 12 visits each week, mostly to frail elders.

Left: Nurse practitioner Robin Sherman visits Frances Irene Ford at home.

Right: The Chelsea Community AIDS Task Force includes representatives from community health, religious, social service, education, and other organizations, as well as interested Chelsea residents.

Robin Sherman is one of the 325 full- and part-time physicians, nurses, social workers, therapists, and others who work at the three MGH community health centers, responding to the needs of 91,000 people representing more than 50 nationalities. In 1991, visits to Chelsea Memorial Health Center, Bunker Hill Health Center in Charlestown, and Revere Health Associates totalled more than 130,000.

In addition to general care for adults and children, including prenatal and obstetric care, each center brings the specialized services of a large hospital to local neighborhoods. The Chelsea center also supports one of the few freestanding Emergency Departments open 24 hours a day in the Boston area.

"Basically, we can provide care from cradle to grave," says Beth Beaumont, RNC, MS, clinical nursing director of MGH Health Centers.

Working as a dedicated team, the multidisciplinary staff of each center has stressed early intervention since the first center was opened in 1968. "Just a few decades ago, problems such as tuberculosis and dental decay were often discovered too late to be treated, let alone prevented," says Roger Sweet, MD, director of MGH Community Health Associates.

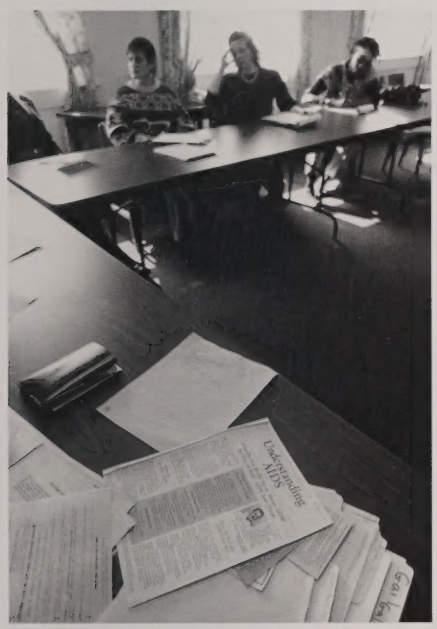
Today, such problems are often caught early, in great part due to the staff's deep, long-standing bonds with their growing patient populations, bonds that encompass neighborhood businesses, schools, police, firemen, and city officials.

Nearly all Chelsea Memorial staff members speak Spanish and English. In Revere, translators for the large local Cambodian population are an integral part of the health care system.

At Bunker Hill, staff and community join forces for Cardiac Risk Factor Day, a popular annual event

held at the local grocery store. Through the Revere center, a weekly clinic at the high school, overseen by a city nurse, monitors patients with tuberculosis.

Meeting monthly at Chelsea Memorial, the Community AIDS Task Force, made up of center staff and Chelsea residents, pursues ways of educating the community on the risk of contracting AIDS. The center's school immunization program reaches closer to the ideal of 100 percent than any other Boston program. And its two-year-old satellite clinic at Chelsea



High School makes health care and counselling easily accessible to the school's 800 adolescents, opening the door to early intervention in substance abuse, pregnancy, sexually transmitted disease, and other problems.

Each MGH health center offers a model for how an interdisciplinary health care system can help buttress a small city against health risks, which in some instances surpass the national norm. Explains nurse practitioner Gail Gall, ANP, "our ties to the schools and community help us reach what otherwise might be unreachable segments of the community."

The Year in Review

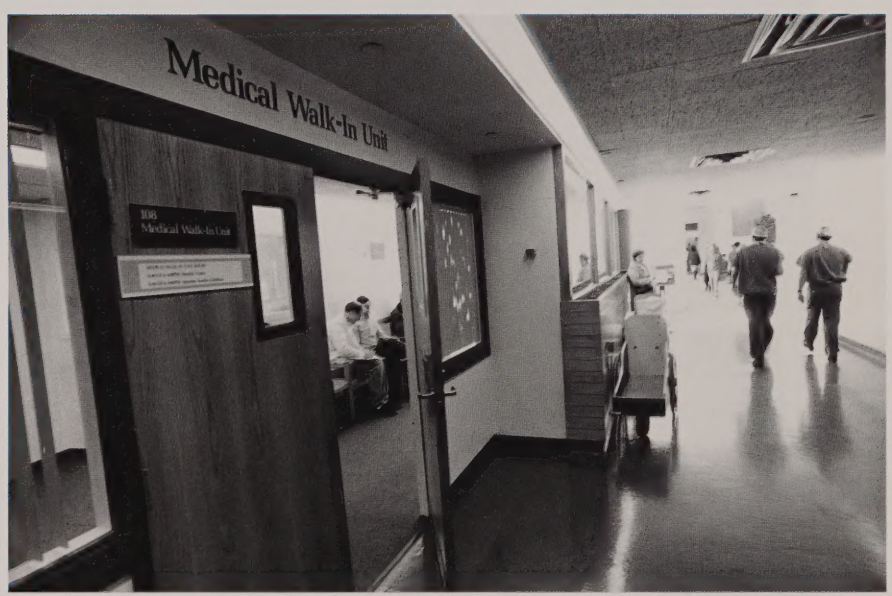
■ ***A new Emergency Department*** The MGH Emergency Department in June moved to new and larger quarters on the first floor of the Ellison Building. "The new facility will bring us from the 1950s to the 1990s," according to Alasdair Conn, MD, chief of Emergency Services. ■ ***The MGH Mammography Center*** In November, the MGH established the largest dedicated breast screening center in New England as part of the Hospital's efforts to provide women with easier access to yearly mammograms. The new Center can screen more than 80 women per day. ■ ***MGH Nurse wins congressional award*** MGH nurse Diana Buckley, RN, was awarded a Certificate of Special Congressional Recognition for her dramatic resuscitation on a city street of an infant who had stopped breathing. Responding to the frantic cries of the child's father, she began reviving the infant even while running to the Emergency Department. ■ ***New service chiefs*** Anne B. Young, MD, became head of the MGH Neurology Service in August. Other appointments during the year were Patricia K. Donahoe, MD, as chief of Pediatric Surgery; W. Scott McDougal, MD, as chief of the MGH Urology Service; Robert Colvin, MD, as chief of Pathology, and Valentin Fuster, MD, as chief of the Department of Medicine's Cardiac Unit . ■ ***Noted researcher comes home*** David H. Sachs, MD, became the first director of the Department of Surgery's new Transplantation Biology Research Center in Charlestown. Dr. Sachs trained at the MGH and spent the last 20 years at the National Institutes of Health, where he achieved an international reputation for his work in basic science and preclinical studies. ■ ***New MGH cancer laboratory*** The MGH Laboratory of Molecular Oncology, under the direction of noted cancer researcher Edward E. Harlow, Jr., PhD, was established in February as a part of the MGH Cancer Center. A major focus of the new laboratory will be on genes and their role in human tumors. ■ ***MGH surgeon named Dean*** R. Bruce Donoff, MD, chief of Oral and Maxillofacial Surgery at the MGH since 1983, was named the tenth dean of Harvard School of Dental Medicine (HSDM). ■ ***One of nursing's highest honors*** Yvonne L. Munn, RN, MSN, director of the Department of Nursing at the MGH and an associate general director of the Hospital, in June was awarded the Mary B. Conceison Award for excellence in nursing administration — the most prestigious award given by the Massachusetts Organization of Nurse Executives. ■ ***A father figure retires*** Paul S. Russell, MD, has retired as chief of the MGH Transplantation Unit, which he founded in 1963. Dr. Russell also served as chief of General Surgical Services from 1962 to 1968. He is continuing his clinical work on the surgical staff, research, and teaching as a professor at Harvard Medical School. "He is one of the real pioneers in organ transplantation, both scientifically and clinically — a true father figure," noted a colleague. ■ ***MGH buys the Charles Street Jail*** The MGH took possession of the Charles Street Jail in September. Portions of the structure will be removed to make way for temporary additional parking space. Future plans for the historic building are being developed. ■ ***Ether Day 1990*** Nearly two thirds of the MGH's 9,700 employees have worked here for 10 years or more. On Ether Day, October 12, the Hospital recognized 886 employees who had reached service milestones ranging from 5 to 60 years. ■ ***A celebration of excellence*** On December 10, the New York Philharmonic saluted the excellence of the MGH and the memory of the eminent composer and conductor, Leonard Bernstein. Sponsored by the Bank of Boston and presented by the Friends of the MGH, the Hospital's first public fundraising event raised $230,000.

CATHERINE JOHNSON entered the MGH Homeless Clinic in the Medical Walk-In Unit last July, complaining of abdominal pains. "She had some impressive symptoms, yet every test I ran turned out negative," recalls Roseanna Means, MD. The two connected, however, and Catherine kept the appointments they set up. Soon Dr. Means began to uncover her patient's history of longstanding and severe personal trauma. She referred Catherine to the Department of Psychiatry, where Anne Hostetler, MD, and a trauma team are helping her come to grips with the psychological scars of her abusive past.

"I don't know where I'd be without Dr. Means and Dr. Hostetler. They really care about what happens to people, and knowing I've got them for support has made all the difference," says Catherine, who now has her own apartment thanks in part to help from the Homeless Clinic.

Despite such success stories, homelessness pervades the city more than ever, increasing in recent years by 8 to 10 percent annually. Of Boston's estimated 9,000 to 16,000 homeless, a small percentage live on the street; the rest rely on 42 shelters, welfare hotels, and other sites across greater Boston for a place to sleep.

MGH caregivers link the homeless to medical treatment, mental health care, and social services.



Left: The Homeless Clinic in the MGH Medical Walk-In Unit receives 15 to 20 visits each week from homeless patients.

Right: When she first came to the MGH, Catherine Johnson was homeless. Now she is renting her own apartment.

In response to the crisis, four years ago the MGH developed the Medical Program for the Homeless under the leadership of Michael Bierer, MD, and in conjunction with the Boston Health Care for the Homeless Program (BHCHP). Working closely with the multidisciplinary MGH Committee on Homeless Persons, the program aims to provide access to immediate and long-term health care for the homeless, coordinating the efforts of MGH doctors, nurses, social workers, and therapists who work in tandem with area shelters and BHCHP.

Usually, homeless patients arrive at the MGH through the Emergency Department, where they accounted for over 1,800 visits in 1991. From there, many are referred to the MGH Homeless Clinic for continued care. In addition, the Social Services Department connects patients with a shelter, provides them with sneakers and sweatsuits donated by local businesses, and helps them obtain any entitlements or benefits they are due.

At the Homeless Clinic, Dr. Bierer and Dr. Means provide primary care and preventive services tailored to the needs of the economically disadvantaged. "Increasingly, word is getting out on the street that people can come here for personalized care," says Dr. Means.

The Clinic can link a homeless person with general and specialized medical treatment, mental health care, and social services in a matter of hours. The staff also makes regular visits to area shelters to try and catch medical problems in the making.

Care for the homeless extends beyond medical procedures. The MGH Human Resources Department has begun a program to match skilled clients referred from BHCHP with appropriate jobs within the hospital.

"It's a great feeling to be able to say, 'Don't worry, we'll take care of you,'" says Dr. Bierer.

"When in distress, every man becomes our neighbor," wrote Drs. John C. Warren and James Jackson in the 1810 letter that inspired the founding of the MGH a year later. The MGH Medical Program for the Homeless is part of their legacy, serving all, regardless of their social standing.

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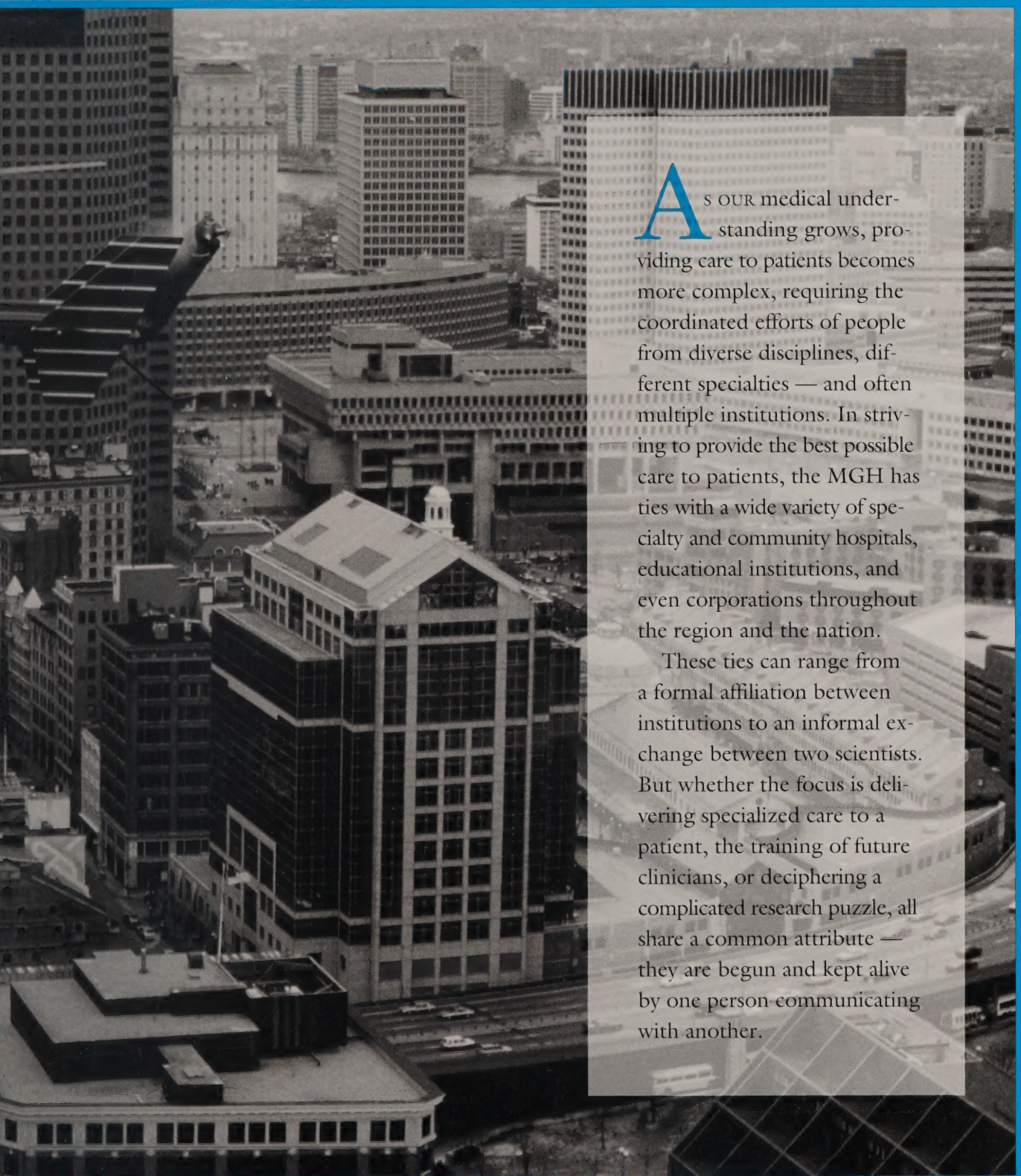
The Region



As our medical understanding grows, providing care to patients becomes more complex, requiring the coordinated efforts of people from diverse disciplines, different specialties — and often multiple institutions. In striving to provide the best possible care to patients, the MGH has ties with a wide variety of specialty and community hospitals, educational institutions, and even corporations throughout the region and the nation.

These ties can range from a formal affiliation between institutions to an informal exchange between two scientists. But whether the focus is delivering specialized care to a patient, the training of future clinicians, or deciphering a complicated research puzzle, all share a common attribute — they are begun and kept alive by one person communicating with another.

LSU

On the day before Thanksgiving, 11-year-old Ryan Gallagher was crossing the street to catch the school bus when he was hit by a speeding car, receiving a severe blow to his forehead. "It was your worst nightmare come true," recalled his mother.

"It was scary leaving the security of the MGH, but after just a few hours at Spaulding, we felt at home."

Unconscious, Ryan was flown from Weston to Boston by the MedFlight helicopter and admitted to the MGH pediatric intensive care unit. For five days he lay in coma while his patient care team worked to control the swelling and pressure inside his head.

The agonizing vigil eased when "suddenly this physician appeared with a twinkle in his eye, talking about moving Ryan to Spaulding Rehabilitation Hospital," recalls Mrs. Gallagher. "Although Ryan was still in a coma, Rob Wharton introduced a new kind of hope. We began talking about the future again."

Spaulding physician Robert Wharton, MD, is part of the MGH-Spaulding Children's Rehabilitation Program. This team of nurses, physicians, therapists, and social workers helps care for MGH pediatric patients who might benefit from rehabilitative care.

Left and right: Ryan Gallagher works with Spaulding physical therapist Marsha Reinstein to rebuild his strength and coordination.

Previous page: Originally established in collaboration with the MGH, Boston MedFlight transports patients from throughout New England to the major Boston-area hospitals.

After 15 days, Ryan began to regain consciousness. He became agitated and would scream and swear. The rehabilitation team helped his family understand that this was a positive sign. Working with Ryan's medications and controlling his environment to diminish stress, they helped begin the rehabilitative process even within the acute care setting of the MGH.

A week after emerging from his coma, Ryan was transferred to Spaulding. "It was scary leaving the security of the MGH," recalls his mother, "but after just a few hours at Spaulding, we felt at home."

Founded in 1970 with the encouragement of the MGH, Spaulding became an MGH affiliate in 1984. Today, it is one of the largest rehabilitation hospitals in the country.

In 1991, about one third of Spaulding's 3,620 inpatients were referred from the MGH for rehabilitation for cancer, stroke, orthopedic problems, and head injuries like Ryan's. In addition, the nurses, aides, social workers, and therapists of the affiliated Spaulding-MGH Home Health Agency last year made almost 57,000 visits to some 1,400 patients in their homes.

Ryan Gallagher spent two months as an inpatient at Spaulding, while therapists, physicians, and nurses helped him begin the long climb back to health. He continues to receive outpatient care.

"Ryan has progressed very rapidly after a severe injury," says MGH pediatric surgeon Daniel Doody, who directed Ryan's care at the MGH. "I am convinced that the close tie between Spaulding and this Hospital is a major contributing factor."

"Early on," says Mrs. Gallagher, "Ryan asked me, 'when will things be the same?' I told him they will never be the same, but we will have wonderful times again. We consider ourselves very lucky to be able to say that."

Forging links with area hospitals helps bring the sophisticated care of the MGH to the community.

THE MGH has forged a wide variety of links with many area hospitals which "help bring the sophisticated care of the MGH to the community," says Robert R. McAnaw, MD, radiation oncologist at Waltham-Weston Hospital and Medical Center. For example, 25 years ago, Waltham-Weston asked renowned MGH cancer specialist C.C. Wang, MD, to help them establish a radiation oncology program. Since then, the MGH has given similar assistance to Mt. Auburn Hospital and Cape Cod Hospital and is developing a joint program with Boston University Hospital that will begin this summer.

In each case, MGH radiation oncologists and technologists run the cancer radiation program and its state-of-the-art equipment, while support services are provided by the individual hospital. "Collaboration saves the community hospital from having to maintain a full-time staff," notes Herman Suit, chief of Radiation Oncology, "which helps provide high-quality care at less cost."

MGH also has close links with its neighbor, the Massachusetts Eye and Ear Infirmary, making possible the multidisciplinary treatment of patients with ear, eye, nose, and throat problems. MGH-MEEI director of Head and Neck Surgery Richard L. Fabian, MD, leads an inter-institutional team of medical and radiation oncologists, technologists, nurses, and social workers who consult on specific head and neck cancer cases.

"In the past five years, the number of these cancer patients has increased markedly," says Dr. Fabian. "With the complexity of medical therapy also increasing, a collaborative approach to patients is required."

At the AtlantiCare Hospital in Lynn, Jessica Kandel, MD, a fourth-year MGH resident in general surgery, measures her days in operations performed.

"Throughout our residency, we look forward to this part of our training, when we have the opportunity to build our technical skills, working alongside busy community hospital surgeons," she says.

Since the early 1950s, MGH surgery residents have spent three months of their training at hospitals in Lynn or Salem, Massachusetts. "This rotation enables our residents to experience the independent practice style

of a community hospital," says Leslie W. Ottinger, MD, director of the MGH surgical residency program.

Salem Hospital surgeon Dexter W. Lawson, MD, himself an MGH resident in the 1960s, notes that the residents enable the hospital to provide its patients with round-the-clock care. In addition, they give the community hospital surgeons an opportunity to teach, which pushes them to keep current.

Connections between hospitals evolve because all of those involved have a central focus — to provide care that is effective, efficient, and convenient for the patient. "Our

goal is to provide quality care to our immediate community," explains Jim Lyons, president of Cape Cod Hospital. "But in achieving that we want to be part of an organized care system that includes a high-quality teaching hospital. The MGH provides that link."

Left: Between operations at a community hospital in Lynn, MGH surgery resident Jessica Kandell, MD, reviews a case with a colleague.

Right: Atlanticare Hospital surgeon Larry Goldberg, MD, in the operating room.

The Year in Review

■ ***Kidney transplants: a milestone*** On August 20, an MGH surgical team performed the Hospital's 1000th kidney transplant, giving a 44-year-old New Hampshire man a new kidney and a second chance at life. The first MGH kidney transplant was in 1963. ■ ***A bridge of life*** For the first time in New England, MGH physicians, led by cardiac surgeon Gus Vlahakes, MD, successfully employed an artificial heart-type device to sustain a 37-year-old Salem woman for a week until a donor organ was found and a transplant performed. Physicians predict that the artifical heart, made by Abiomed, Inc., will offer additional hope to cardiac patients waiting for donated organs to become available. ■ ***New cyclotron center planned*** The National Cancer Institute awarded a $750,000 grant to the MGH in October to begin planning a Proton Medical Facility that would be a national medical resource for research and treatment of certain forms of cancer. The MGH, working with the Massachusetts Eye and Ear Infirmary and the Harvard Cyclotron Laboratory, has been a leader in proton beam cancer therapy for some 16 years. ■ ***First liver-bowel transplant in New England*** In April, an eight-year-old New Hampshire boy became one of only a few people in the world to successfully undergo the most difficult type of transplant surgery ever achieved — transplantation of the combined liver and bowel. The operation, led by A. Benedict Cosimi, MD, was performed at the MGH for the first time in New England. ■ ***The 50th anniversary of the "atomic-cocktail"*** Drinking a solution of radioactive iodine to control an overactive thyroid gland (hyperthyroidism or Graves disease) was a treatment first developed at the MGH in 1941 by Saul Hertz, MD, former chief of the Thyroid Clinic, and Arthur Roberts, PhD, of the Massachusetts Institute of Technology. Both President and Mrs. Bush drank "atomic cocktails" to treat their overactive thyroids. ■ ***MGH one of the best*** A national poll of 965 health care experts published in August in *U.S. News and World Report* chose the MGH as one of the 10 best hospitals in the country. ■ ***First MGH-Merck minority fellowships awarded*** The MGH and Merck Sharpe & Dohme Laboratories have established a minority fellowship designed to be the premier student research opportunity in the country. In July, Harvard Medical School students Marissa Howard and Tamara Callahan were awarded the first MGH/Merck fellowships, which include a $10,000 stipend and funding for a 10-week summer research program at Merck Laboratories. ■ ***First nurse appointed to presidential panel*** In May, Deborah Mayer, RN, MSN, OCN, became the first nurse to sit as a science member on the National Cancer Advisory Board, a presidentially appointed board advising the Director of the National Cancer Institute and other officials of the U.S. Department of Health and Human Services. Ms. Mayer is an assistant professor in nursing at the MGH Institute of Health Professions. ■ ***Institute of Health Professions*** In December, the MGH Institute received its 10-year reaccreditation from the New England Association of Schools and Colleges. The Institute first became accredited to award graduate degrees in nursing, dietetics, physical therapy, and speech pathology in 1985. ■ ***Fox Hill Village opens*** Fox Hill Village, the MGH's continuing care community, opened in September. Covering 83 wooded acres in Westwood, the community features 356 apartments and a 70-bed nursing home. The village is a joint venture of the MGH Health Services Corporation and Hillhaven Corporation, a private developer.

THE LIGHTS of McLean Hospital's MRI Center burn late on Wednesday evenings. Inside, a research team of MGH and McLean psychiatrists, radiologists, and technicians are employing a magnetic resonance imaging machine to gain insights into better ways of treating patients with manic depression.

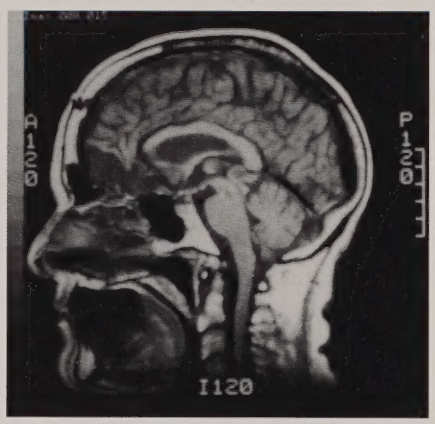
Lithium is often the medication used to treat the illness; some patients respond well, but many others do not. "It could be that in certain patients, sufficient lithium isn't reaching the brain," notes Gary Sachs, MD, MGH director of Bipolar Research. Utilizing new magnetic resonance imaging techniques, the MGH-McLean team is testing this theory by measuring the concentration of lithium within a patient's brain cells. Their research could reveal ways of more precisely prescribing lithium and other drugs, providing better results for patients.

MRI teams are also seeking to answer questions such as what happens when brain cells are activated by certain stimuli? How do drugs change brain activity? How do genes in brain cells switch on and off?

"The potential for MRI collaboration is enormous," maintains MGH neuroscience fellow and psychiatry resident Perry Renshaw, MD, PhD.

Numerous collaborative research projects are helping to bring together the two affiliated institutions. Involving dozens of scientists and clinicians, these projects combine the strengths and expertise of MGH and McLean in an effort to better understand and treat a host of mental illnesses. The result will be large gains for both of the hospitals and for patients.

Numerous research projects are bringing together the strengths and expertise of MGH and McLean.



Meanwhile, new and stronger links are also being forged in clinical care and in medical and psychiatric training. Among its many departments, the MGH has the largest outpatient psychiatric unit in New England and an extremely busy psychiatric emergency service. In comparison, McLean, a freestanding psychiatric hospital, supports a large psychiatric inpatient unit and community residence program as well as outpatient clinics.

Increasingly, a patient entering either hospital has access to the other's expertise. Today, the MGH Acute Psychiatric Service, known worldwide for its skills in emergency psychiatry, sends more than 20 percent of its patients to McLean for hospitalization. Likewise, McLean refers a growing number of patients in need of acute medical or surgical care to the MGH.

Since horse-and-buggy days, the road between the MGH and McLean has proven a well-trodden byway for training. Many of the psychiatry residents from one institution elect to do part of their training at the other. As part of a joint neuroscience fellowship program, MGH neurology residents spend 10 weeks on the McLean campus.

On July 1, 1991, Joseph Coyle, MD, was appointed as chairman of the Consolidated Department of Psychiatry. Besides the MGH and McLean, this new consortium includes the psychiatry departments of the New England Deaconess, Massachusetts Mental Health Center, Brockton-West Roxbury VA Medical Center, and Brigham and Women's Hospital.

"The exciting aspect of this consolidation is that each of these hospitals has world-class strengths," notes Dr. Coyle. "Tying the separate programs together could have a tremendous impact on the ability of psychiatry to understand and treat patients with mental illness."

Left: MRI scans have revolutionized the way physicians and scientists look at the human body.

Right: (left to right) Technician Craig Miller, MGH radiologist Dr. R. Gilberto Gonzalez, MGH psychiatry resident Dr. Perry Renshaw, MGH psychiatrist Dr. Gary Sachs, and McLean psychiatrist Dr. Andrew Stoll study the MRI scan of a patient receiving lithium therapy.

WITHIN THE Wellman Laboratories of Photomedicine, researchers are working with high technology companies to harness lasers in treating a broad range of illnesses. Some projects, such as certain skin disease treatments, have become standard therapies, while others are in the research stage, such as treatments for heart disease and cancer.

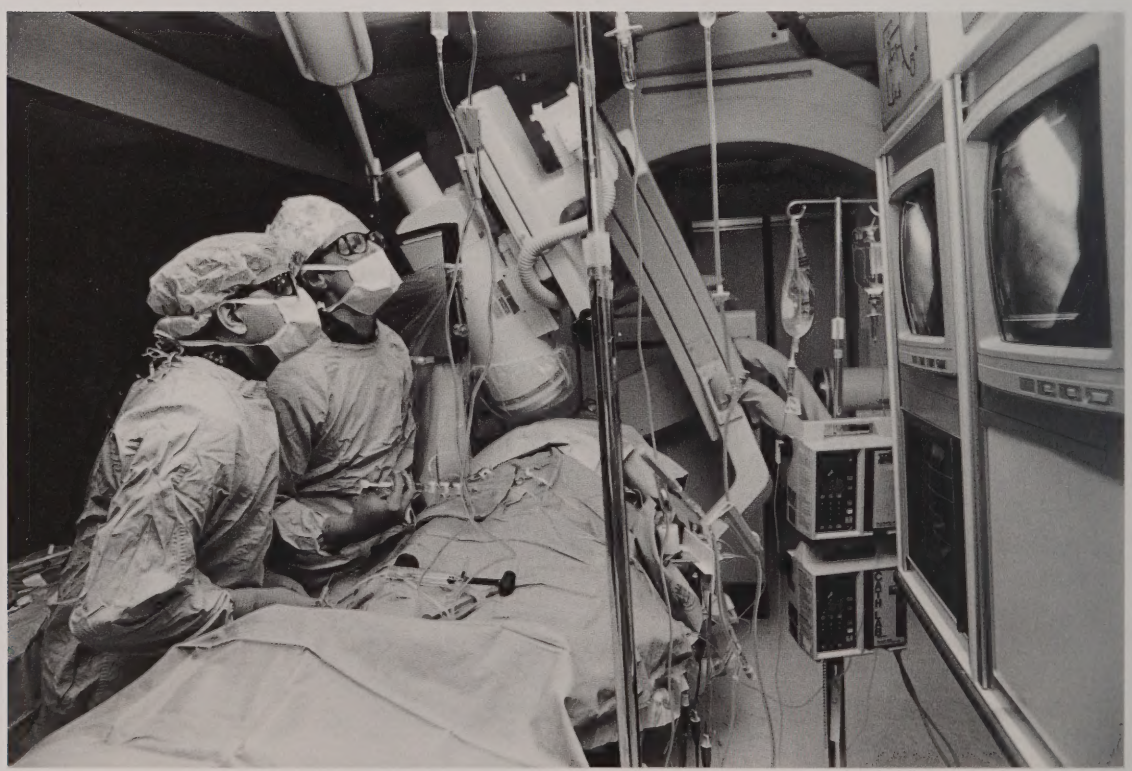
People at the MGH stretch those they collaborate with, and in turn stretch themselves.

On eight patient care units, MGH nurses are using a computer to closely monitor the vital signs of their more acutely ill patients — without leaving the nurses' station. Hospital nurses and engineers have collaborated with Protocol, Inc., to link the company's small, portable patient monitors to a centralized work station.

"The people here tend to push the limits all the time," says Ronald Newbower, PhD, vice president for Research Affairs. "Because they are always doing new things, they demand more of their equipment. Often, working closely with a manufacturer is the only way they can get what they want."

In 1989, when the MGH was building the James Knight Cardiac Catheterization Laboratory, it was able to acquire equipment that would meet future demands in every area except one — the instrumentation that translates a patient's heart beat into a moving electronic wave on a monitor. "We didn't want to invest in technology that was going to become obsolete in five years," explains cardiologist Robert Leinbach, MD.

The MGH cath lab team talked to



four different companies, explaining their problem. They chose Hewlett-Packard. "The timing was right," says Dr. Leinbach. The company was in the process of designing a new computerized monitoring system to replace the less efficient mechanically based equipment.

Hewlett-Packard agreed to loan the MGH interim equipment for the new cath lab, while Dr. Leinbach and senior cardiovascular technician Isil Yasar began to collaborate with the firm, contributing their clinical advice and expertise.

The collaboration proved rewarding for both parties. "Dr. Leinbach is a top-notch clinician, who wants the data collected and presented in a way that maximizes his ability to make judgments about his patients," says Arthur Robertson, a Hewlett-Packard product manager. "If we can meet his needs, we will have a better quality product."

For the cath lab, the new instrumentation represents a leap in technology equivalent to exchanging a typewriter for a word processing system, explains Dr. Newbower. The result is a system that will have the flexibility to meet the lab's present and future needs, yet will cost less.

Often, individuals at the MGH will identify a need, only to discover that the technology to meet that need has not yet been developed. Rather than wait for industry to catch up, they seek out corporate collaborators.

As a result, adds Dr. Newbower, "People at the MGH stretch those they work with, and in turn stretch themselves to levels that they might not have originally aimed at."

Left: In the James Knight Cardiac Catheterization Laboratory, MGH cardiologists Dr. Robert Leinbach and Dr. Manoj Khandelwal work to unblock a patient's artery.

The Year in Review

■ ***MGH scientists find elusive cancer gene*** In April, MGH scientists found what appears to be a long-sought gene important in breast cancer. The same oncogene (cancer gene) may also be the elusive cause of a type of malignant lymphoma. The gene could be implicated in about 15 percent of the 143,000 new cases of breast cancer in the United States each year. ■ ***Mice completely fooled*** In June, MGH researchers reported that they had successfully tricked mice into accepting insulin-making cells transplanted from humans. The immune systems of the mice were so completely fooled that no drugs were needed to prevent rejection. The experiments hint at a potential cure for many diabetics now taking insulin every day, as well as the more distant possibility of a solution to organ rejection in transplantation. ■ ***Muscle disease cause identified*** The identification of the cause of a muscle disease known as hyperkalemic periodic paralysis was reported in April by scientists from the MGH and Howard Hughes Medical Institute. The problem — a defective gene — causes a malfunction in a specific protein in the muscle cell wall. The findings may have implications for similar muscle disorders as well as a number of other diseases, from cardiac arrhythmias to epilepsy. ■ ***Weak bones may be irreversible*** An MGH study published in March found that osteoporosis associated with the eating disorder anorexia nervosa may be irreversible. The study, led by Nancy A. Rigotti, MD, of the MGH General Internal Medicine Unit and Eating Disorders Unit, monitored 27 anorexic women over four-and-a-half years and was the first examination of bone mass in anorexic women over time. ■ ***A study of attitudes towards living wills*** In surveying a group of MGH outpatients and a sampling of Bostonians, Linda L. Emanuel, MD, PhD, and colleagues found that nearly all felt that completing an advance directive, which describes a patient's wishes in the event he or she should become unable to make decisions regarding their care, is highly desirable. The survey also found that the nature of the topic was not considered a major barrier and indicated that directives could easily be completed during an office visit. ■ ***New infertility research center*** The Hospital was awarded a $3.9 million grant from the National Institutes of Health to establish one of two national centers for infertility research. In addition, the MGH received a $1.6 million cross-departmental grant to establish the MGH Reproductive Endocrine Science Center for research into abnormalities of the reproductive endocrine system, including delayed and precocious puberty and other growth disorders. ■ ***A new center for brain disorders*** Brain aneurysms are blood-filled bubbles at a weak spot on the wall of an artery. If an aneurysm grows and bursts, it can cause death. An arteriovenous malformation (AVM) is a tangle of arteries and veins that also can bleed catastrophically. AVMs also may cause headaches or seizures. To better combat these disorders, the MGH announced the formation of a Brain Aneurysm/AVM Center, under the direction of Robert M. Crowell, MD. ■ ***MGH awards prestigious Trustees Medals*** In February, three renowned researchers became the second group of scientists to be awarded the prestigious MGH Trustees Medals, recognizing American physicians and scientists whose lifetime contributions to medicine have benefited humankind. The award, established in 1986, was presented to Claude E. Welch, MD, a retired MGH surgeon; Daniel C. Tosteson, MD, Dean of the Harvard Medical School; and J. Michael Bishop, MD, a cancer researcher from the University of California, San Francisco.

James Dunn has found a way to keep liver cells alive and well. This accomplishment will be the basis of his doctoral thesis in bioengineering, but it also represents a crucial step forward in the development of an artificial liver.

Teaching is an activity that permeates every area of the MGH.

For a patient who is wheeled into the Emergency Department with acute liver failure or someone awaiting a transplant, an artificial liver could provide life-sustaining support. This scenario may become a reality within the next decade, but first many obstacles must be overcome. One of them was simply how to keep liver cells alive and healthy outside the body, explains Martin Yarmush, MD, PhD, an MGH researcher in the Department of Surgery and Mr. Dunn's thesis advisor.

Mr. Dunn has discovered a way of simulating the normal conditions of the liver, enabling the cells to survive outside the body for months. "I enjoy taking clinical problems and using quantitative, engineering approaches to solve them," explains Mr. Dunn, who is in the last stages of obtaining dual MD, PhD degrees from Harvard Medical School and the Massachusetts Institute of Technology.

Mr. Dunn is one of a group of students in the Harvard-MIT Health Sciences and Technology Program, who are "very self-motivated, self-directed, and innovative," says Patricia Donahoe, MD, chief of Pediatric Surgery.

The fact that the MGH is an academic medical center is well known. What few realize is that the MGH has a larger student body than most colleges. More than 25,000 individuals came to the MGH last year to further their education and training.

Certainly one of the most extensive teaching activities at the MGH is the training of almost 800 clinical residents and fellows. Each year, about 150 new physicians-in-training enter MGH residency programs. The screening process is a rigorous one, in which applicants are interviewed by various committees as each department looks for those who will become strong members of the patient care team.

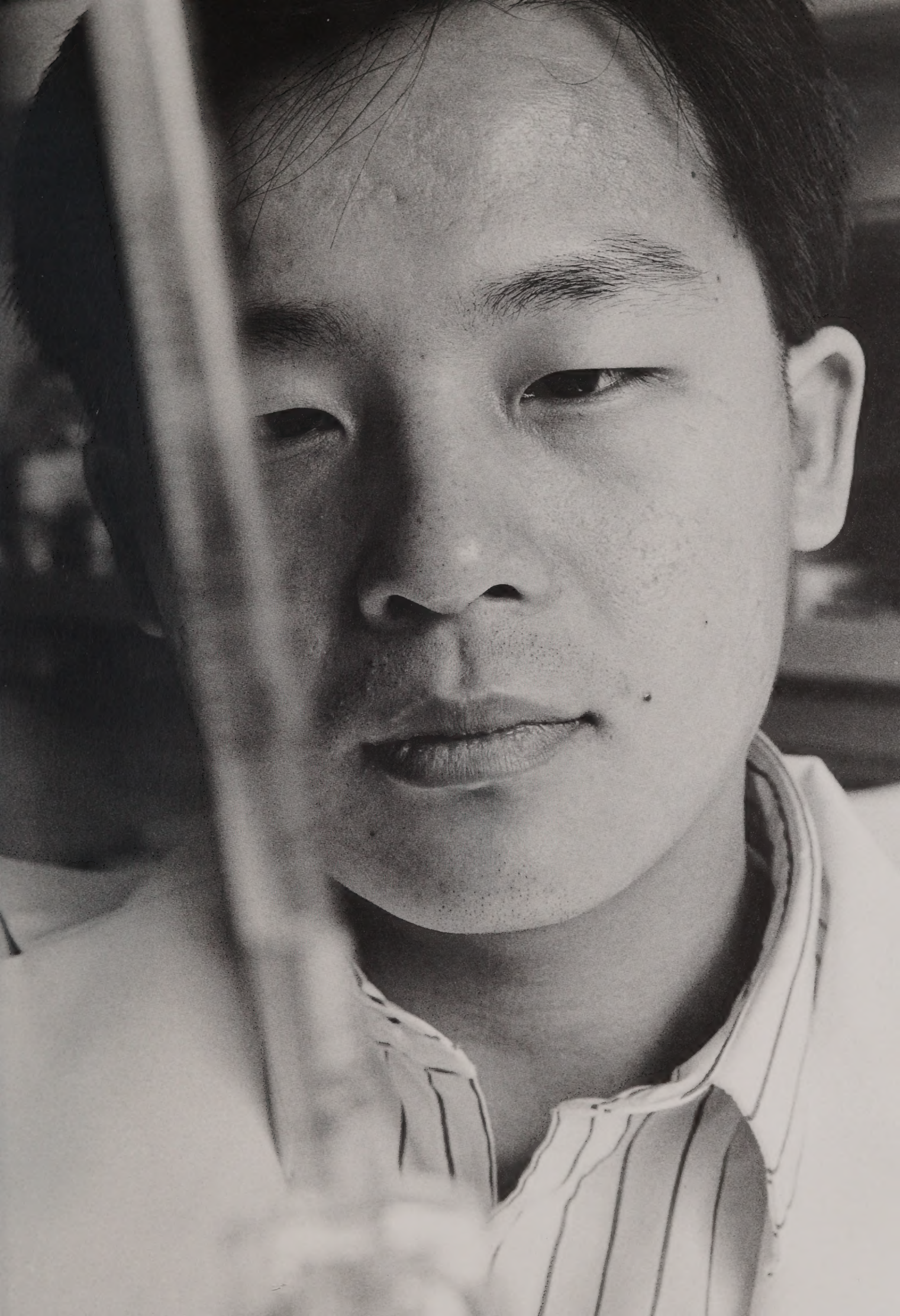
"This Hospital has a long tradition of training physician-scientists who go on to become leaders in medicine and research throughout the world," says Henry Mankin, MD, acting chairman of the Committee on Education and Training.

At the MGH Institute of Health Professions, individuals like speech pathology student Jeffrey Anderson are being trained to take on leadership roles in dietetics, nursing, physical therapy, and speech language pathology. Established in 1977, the IHP is an independent, fully accredited graduate school. The IHP's 60 faculty members hold joint appointments with the MGH and other area hospitals and universities, assuring the Institute's 300 students insight into current practices and research. "Our symbiosis with the MGH," notes Patrick McCarthy, president of the Institute, "enables us to offer our students an educational richness that is unique."

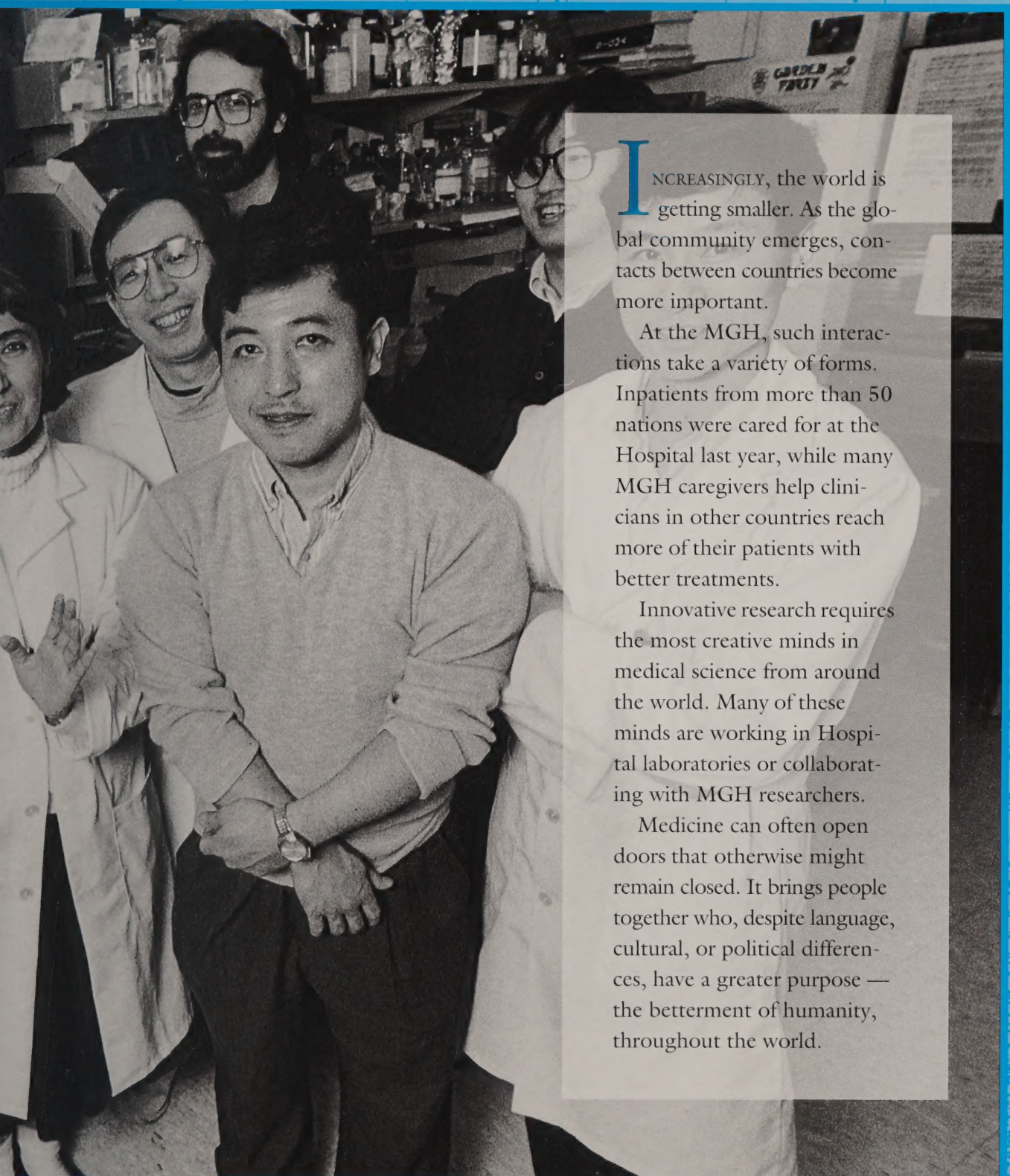
Teaching is an activity that permeates every area of the MGH. It occurs in conference rooms, hallways, by patient's bedsides, at the laboratory bench. As a renowned MGH surgeon once said, "there is no higher gratification than seeing someone you taught do something better than you."

Left: Jeffrey Anderson, an IHP speech pathology student, works with an automobile accident victim.

Right: Harvard-MIT student James Dunn at the lab bench.



The World

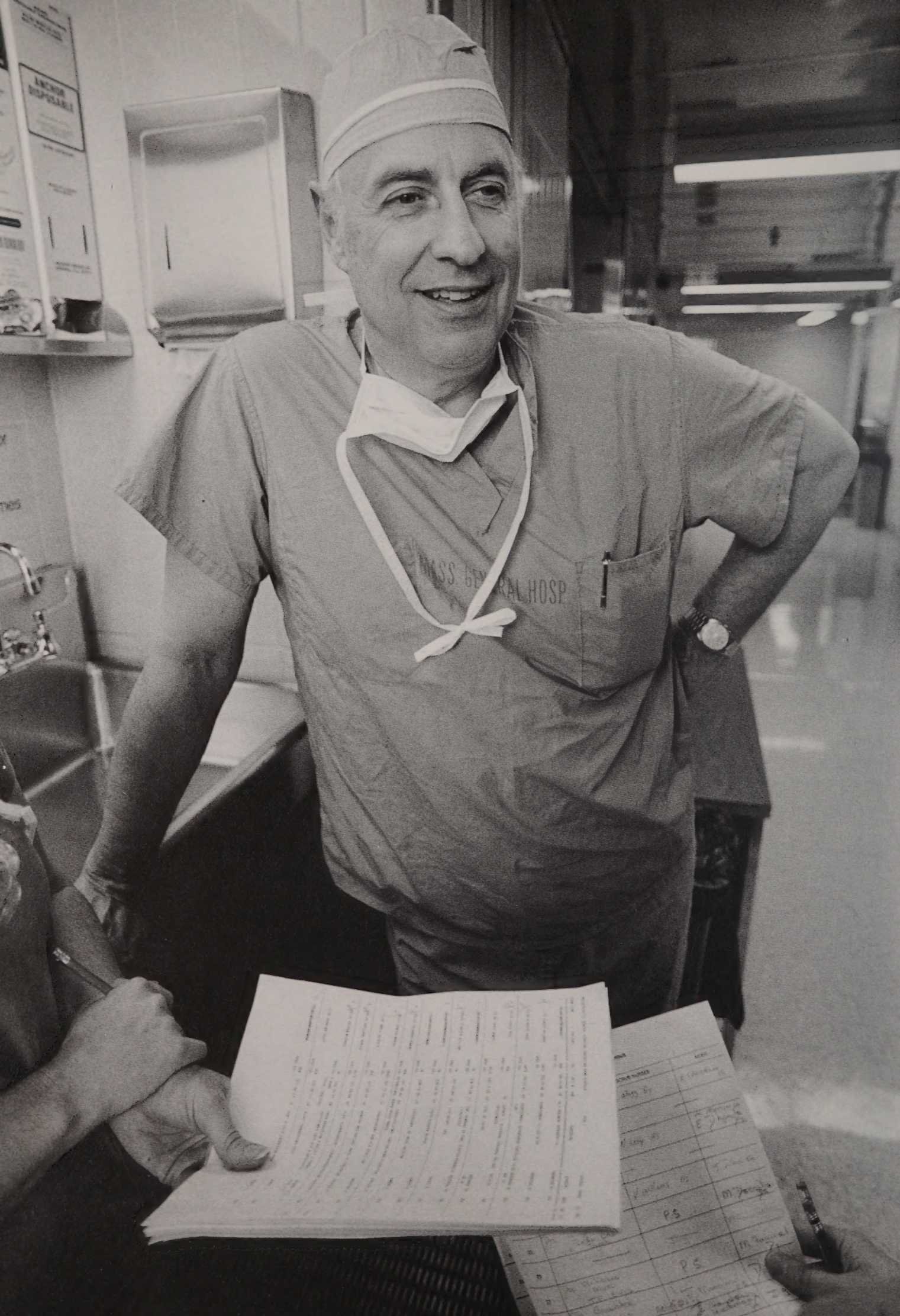


INCREASINGLY, the world is getting smaller. As the global community emerges, contacts between countries become more important.

At the MGH, such interactions take a variety of forms. Inpatients from more than 50 nations were cared for at the Hospital last year, while many MGH caregivers help clinicians in other countries reach more of their patients with better treatments.

Innovative research requires the most creative minds in medical science from around the world. Many of these minds are working in Hospital laboratories or collaborating with MGH researchers.

Medicine can often open doors that otherwise might remain closed. It brings people together who, despite language, cultural, or political differences, have a greater purpose — the betterment of humanity, throughout the world.



On December 21, 1990, as John P. Remensnyder, MD, removed the infected burns of a 12-year-old boy at Moscow's Hospital No. 9, the Russian staff watched with complete skepticism. "The Soviets had never seen the aggressive techniques we use here; they thought I was going to kill the boy," recalls Dr. Remensnyder. The boy not only lived, but was able to leave the hospital a few weeks later. "It was a major breakthrough in terms of their trust in our procedures."

Australia. Europe. Asia. South America. The Antarctic. Few regions exist where MGH physicians, nurses, therapists, and others haven't traveled. Natural catastrophes, rescue missions, refugee care, rare diseases, lecture engagements — the reasons drawing these clinicians to distant shores are as diverse as the services they bestow.

Scores of MGH physicians and nurses volunteer their services overseas. Through Project HOPE, an organization that brings health care education to the developing world, Dr. Remensnyder and coworkers introduced techniques that reduced infection rates from 43 to 3 percent, saving many lives.

MGH-HOPE physicians and nurses are also helping to introduce modern health care methods into China. When Sheila Burke, RN, BSN, first went to China five years ago, post-operative patients were confined to their beds an average of six weeks. "We helped to improve that. Now most patients are up after two to three days," says Ms. Burke.

Last May, Michelle Wall, RN, spent two weeks in pediatric surgery in Ecuador through the non-profit relief organization Por Christo Ecuador. "The people traveled for days when they heard a U.S. medical team was coming," says Ms. Wall. "I've never worked harder, but it was the best experience of my life."

At the height of the Vietnam War, Dr. John Constable, MD, helped in the first full investigation of the medical and ecological effects of Agent Orange. Last year he was the first foreigner to be awarded Vietnam's Order of Friendship.

Since 1983, MGH physicians, administrators, architects, planners, and others have volunteered their time and travelled to India to help the Hinduja family of Bombay build and run a modern hospital to help meet the country's vast health care needs. In Pakistan, the MGH has advised the Aga Khan in building a network of hospitals.

Few regions exist where MGH staff haven't traveled, exchanging knowledge and establishing long-lasting bonds.

For 25 years, Thomas Durant, MD, a long-time volunteer for the American Refugee Committee, has worked tirelessly on behalf of refugees in Cambodia, Ethiopia, and Afghanistan. Shortly after the Persian Gulf War, he spent a month in Kurdish refugee camps in Iraq, helping to quell outbreaks of cholera, typhoid, and dysentery. "Volunteering overseas is the most physically challenging, most philosophically rewarding work I've ever done," says Dr. Durant.

In the past two years, Bertram Zarins, MD, has introduced arthroscopy to five Latvian hospitals. "I wanted to give something to the country where I was born," he says.

"This institution has enormous resources," says Lawrence Martin, MGH senior vice president. "I believe that when someone asks for our assistance, we have a certain responsibility to help."

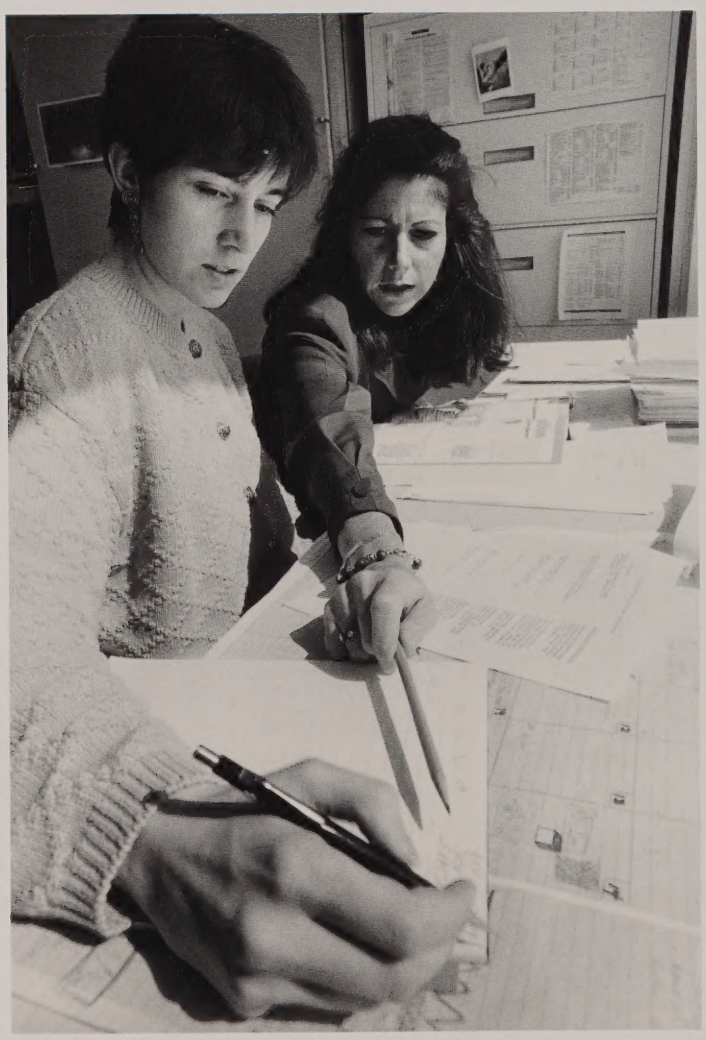
Left: Dr. John P. Remensnyder with his colleagues during a break outside the operating room.

Right: Sheila Burke and Lin-Ti Chang, who accompanied Ms. Burke to China as a collaborator and translator.

Previous page: Within the Endocrine Laboratory, researchers represent Austria, Japan, Italy, Greece, China, and France.

WHEN Anne M. Fiore, RN, MS, first entered the pediatric unit of St. Joseph's Hospital in Reykjavik, Iceland, last April, every aspect of the ward filled her with pride. Eight years before, Ms. Fiore had counselled two Icelandic nurses visiting the MGH. The advice they took home helped them transform their facility into a vibrant, efficient children's unit.

"When you travel, you discover it's a two-way street, and you end up feeling you've learned more than you've given."



"It was just like stepping into our old Burnham Building pediatric unit," said Ms. Fiore. "They too had managed to overcome physical constraints to create a caring atmosphere for children and their families. I had this overwhelming sense of how much can be accomplished when professionals from different countries share expertise."

For nurses everywhere, a new era has arrived. More autonomous and less isolated than their predecessors, increasingly nurses are expanding their horizons and trading information with their global counterparts.

"In sharing our expertise with the world, we also broaden our own knowledge," notes Yvonne L. Munn, RN, MSN, director of Nursing. "This exchange is crucial to fulfilling our role as an international leader in nursing."

Through an OR Nursing Service education grant, Gloria Moran, RN, BSN, and Margaret Walsh, RN, BSN, traveled to Sweden to study operating room practice in three hospitals. Some of their observations are being implemented to improve MGH procedures. "I believe we can learn a great deal from how the Swedes cater to the mental health of their patients and their staff," notes Ms. Moran.

"Word is getting out that the MGH holds a cadre of nurses who can help plant the seeds of new ideas in other parts of the world," says Glenys A. Hamilton, RN, DNSc, whose Fulbright Hays Scholarship took her to the Univer-

sity of Oslo as a lecturer and researcher for a year. "Yet when you travel, you discover it's a two-way street, and you end up feeling you've learned more than you've given."

Exchanges often begin with nurses who come to Boston. Last year, more than 70 nurses and nursing students arrived from countries all over the world for a first-hand look at MGH procedures. "What's especially energizing is that cultural differences are not a barrier because we share the same desire for excellence in patient care," says Diana Fairfax Miller, RN, BSN, visitor coordinator for the Department of Nursing.

For example, the Hospital welcomed dozens of Japanese nurses, who were especially excited to be at the MGH. Translated publications by MGH nurses are used throughout Japan, as is an MGH-authored videotape on nursing diagnoses. "It was tremendously instructive, as well as rewarding, to hear how they've put our theories into practice," notes Joan B. Fitzmaurice, RN, PhD.

"Teaching others what we do provides an incentive for busy people to use their brains, to think, to write," says Edward Coakley, RN, MSN, director of Operating Room Nursing. "And by sharing what they are doing, they actually begin developing ways to do more. The result is we improve the care delivered here."

Left: Anne M. Fiore and nurse manager Carolyn Anderson review the Hospital's new critical care technician training program.

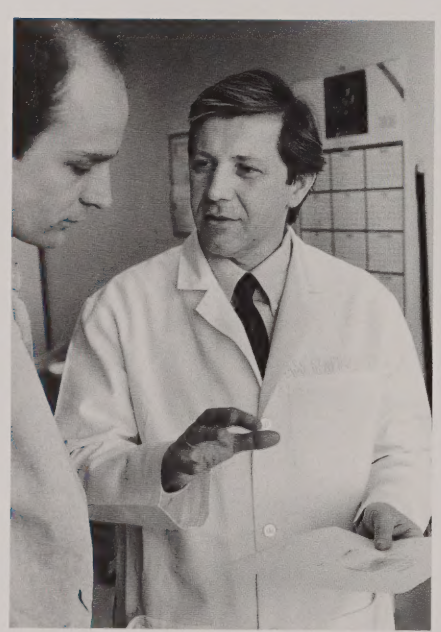
The Year in Review

■ ***Therapist of champions*** MGH physical therapist Gary Geissler had a front row seat when the U.S. Track and Field Team competed in the Third IAAF World Championships in Athletics in Tokyo, Japan. In prestige and competitiveness, this event is second only to the Olympics. Mr. Geissler was selected by the Athletics Congress to be part of the official medical staff for the team. ■ ***Fighting the Kuwaiti fires*** Michael Landry, a heavy equipment operator working to salvage the oil fields of Kuwait, miraculously walked out of a flaming inferno when his bulldozer accidently touched off an oil well fire. Thanks to aggressive burn treatments and physical therapy received at the MGH, Landry was writing letters just two weeks after the incident. He intends to return to his job in Kuwait when he is fully recovered. ■ ***A Cambodian family reunited*** Saravuth Oeun was reunited with his family for the first time since escaping from Cambodia 15 years ago. A lab technician in cardiac research, Oeun had made a videotape of his U.S. family and given it to MGH physician Thomas Durant, MD, who managed to find Oeun's lost brother while traveling in Cambodia. ■ ***A deadly virus*** In June, a team of MGH Cancer Center researchers identified mutations in the Hepatitis B virus that may turn the liver disease into a killer. The team, led by MGH physician T. Jake Liang, MD, studied a mutated virus that caused an epidemic in an Israeli hospital, killing all five of the people who contracted it. The discoveries may lead to a better understanding of hepatitis and help for the estimated 200 to 300 million people worldwide who are carrying the virus. ■ ***The origin of all life*** MGH scientists, led by Jack Szostak, PhD, and Jennifer Doudna, PhD, in March showed for the first time that ribonucleic acid (RNA) can at least partially replicate itself. The finding generated much excitement in scientific circles since it lends credence to the theory that RNA was the first molecule capable of reproducing itself — independently and exactly — and could therefore have been the origin of all life. ■ ***New laser skin treatment center*** In August, the MGH opened the MGH Dermatology Laser Center capable of treating up to 200 patients a week for port wine stains, spider veins, tattoos, and other skin disorders. The Center, combined with the existing Wellman Research Laboratories, represents one of the largest medical laser treatment and research facilities in the world. ■ ***Cutaneous Biology Research Center dedicated*** In May, the MGH dedicated the MGH-Harvard Cutaneous Biology Research Center (CBRC), a major dermatology research center established with a 10-year, $85 million grant from Shiseido Company Limited of Japan. The CBRC officially opened with a major research symposium in October. ■ ***First director named for MGH imaging research center*** Gerald L. Wolf, MD, PhD, was appointed first director of the MGH Center for Imaging and Pharmaceutical Research (CIPR) in September. The center, thought to be the only one of its kind in the world, is expected to help U.S. pharmaceutical companies trim millions of dollars a year off the cost of evaluating new drugs through the study of the interrelation of drug development and diagnostic imaging techniques. ■ ***A grant to study nerve cell regeneration*** The MGH received a grant from two Japanese companies, Sumitomo Chemical Company and Sumitomo Pharmaceuticals Company, for work on proteins related to the growth and regeneration of nerve cells. The research is led by Mark C. Fishman, MD, chief of the MGH Medical Services Developmental Biology Laboratory.

THREE YEARS AGO, when Ivan Sabolić, MD, PhD, arrived in Boston, he was a professor of physiology at the School of Medicine in Zagreb, Yugoslavia. Now his country has become the Republic of Croatia, and it is torn by civil war.

"I am not afraid to go home," states Dr. Sabolić, "but I am afraid to spend maybe years not doing any research. Science is changing, moving so fast, if I am not in science for one or two years, there is a very high possibility I would be left behind. In Croatia, there are no funds and no resources at the present."

Vital skills and knowledge add a United Nations flavor to the institution.



Dr. Sabolić came to Boston after meeting Dennis Brown, PhD, a researcher in the MGH Renal Unit, at an international scientific conference in London in 1987. "He asked if I would be interested in having him work in my lab," recalls Dr. Brown. "I knew of his work and I was very glad to have him come. He was one of the first to describe some of the key aspects of kidney function."

Both researchers are interested in how the kidney removes acid, which builds up when the body breaks down protein. By understanding the complex channels by which kidney cells regulate acid concentrations in the blood, they hope to gain insights that will someday yield better treatments for patients with kidney disease. In addition, understanding this system should provide clues to many other diseases involving cells that utilize similar mechanisms.

Dr. Sabolić and Dr. Brown, a native of England, have both left behind friends and family in pursuit of science. Dr. Sabolić spent his first six months in the United States alone in a room found for him by the MGH Service League before his wife and two daughters could join him. Yet, he has found camaraderie in science. "The levels of collaboration here have particularly impressed me," adds Dr. Sabolić. "Other places, there was no cooperation, even with the person at the lab bench just a meter away."

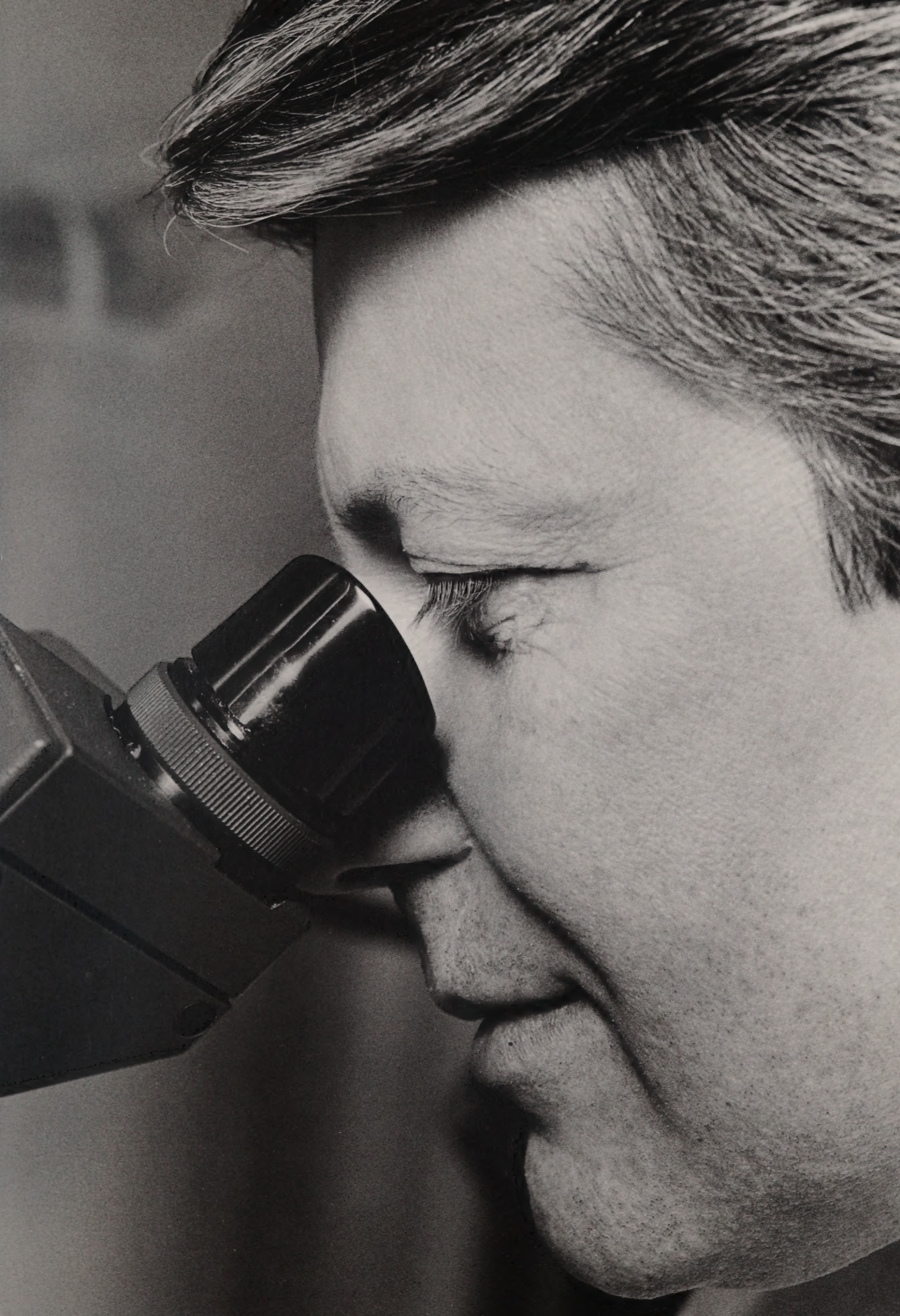
Still, Dr. Sabolić and his family hope someday to return to their country.

Ivan Sabolić is one of some 13 visiting professors who are currently at the MGH. In addition, nearly 700 individuals — 71 percent of all research fellows — represent nearly 60 countries from Argentina to the United Kingdom. Their skills and knowledge are vital to the functioning of the research laboratories, while they add a United Nations flavor to the institution. Many of these highly talented individuals remain in the United States, while others leave to take on leadership roles across the globe. Nearly all retain their links to the MGH.

"When cardiology was in its infancy, Dr. Paul Dudley White had to travel from the MGH to Europe to learn electrocardiography," says Joseph Bonventre, MD, PhD. "Today physicians and scientists come to the MGH to learn the most recent developments in medical care and research."

Left: Dr. Sabolić and Dr. Jean-Marc Verbavatz analyze research data.

Right: Dr. Sabolić is one of some 13 visiting professors currently at the MGH.



The General Hospital Corporation

Excerpts from audited financial statements (in thousands of dollars)

Income

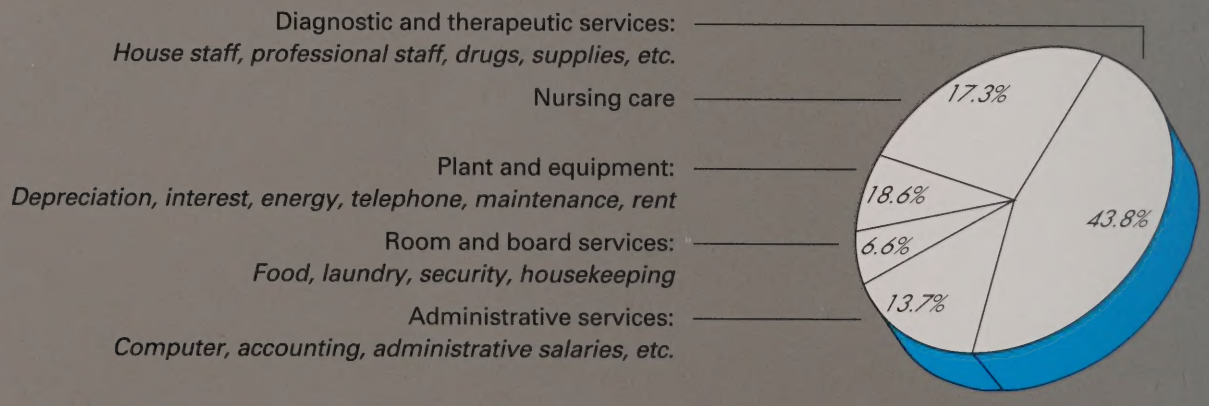
	1991	1990*
From patient care	$614,318	$497,225
less contractual allowance	124,377	74,203
less charity care	23,498	17,853
	466,443	405,169
Revenue and other specific purposes	137,712	122,066
Other	24,112	21,405
Total Operating Revenue	**$628,267**	**$538,835**

Expenditures

For operating expenses:		
Salaries and related compensation	$306,225	$272,574
Supplies, expenses, depreciation	214,470	180,014
Provision for doubtful accounts	11,852	9,805
	532,547	462,393
Research and other specific expenses	94,548	85,778
Total Operating Expenditures	**$627,095**	**$548,171**
less total operating revenue	628,267	538,835
Surplus (Loss) from operations before adjustments	1,172	469
Adjustment for third party payors, change in accounting method, and transfers to restricted funds	4,778	2,878
Other income	3,244	3,110
Surplus (Loss)	**$9,194**	**$6,457**

*Year ending September 30, 1991

The Hospital's Dollar



MGH Facts and Figures

Beds	1,043	Clinical fellows	290
Number of admissions	35,838	Residents	500
Number of ambulatory visits	519,340	Research fellows	560
Inpatient surgery	19,493	RNs	2,230
Emergency department visits (main campus)	65,608	LPNs	70
Day surgery	8,405	Nursing assistants	171
Active staff	2,038	Volunteers	1,248
		Employees	9,816

Chairman's Report

OVER THE YEARS, I have been struck by the sense of dedication and confidence that pervades this Hospital. It springs from a deeply rooted tradition of leadership in patient care extending back more than 180 years. But its source is a knowledge of the importance of the Hospital's mission of patient care, research, and education. In part, I believe that it is this confidence that causes those who are associated with the Massachusetts General Hospital to reach out to those beyond its walls.

Those who work within a hospital have a unique privilege. Applying their skills in the service of those who are ill or injured, they touch peoples' lives in a singular and fundamental way. As members of the MGH community, we all share a responsibility to help those in need and to lend assistance and advice to those who seek to help others.

As you have read in this year's Annual Report, MGH staff extend the resources of this Hospital to those both within the immediate neighborhood and throughout the world. And in using their expertise to assist others, they gain new knowledge and understanding in return.

The openness of the MGH to sharing and receiving information is part of what enables the Hospital to successfully find solutions for new obstacles. In the coming years, the MGH will certainly be presented with continued challenges, as our society seeks ways to ensure that everyone is receiving adequate health care, while providing that care more efficiently and at less cost.

With this report, my final year as chairman of the Board of Trustees of the General Hospital concludes. As I look back over the last five years, I can say it has been an honor to serve this Hospital, and I would like to thank the board and the staff for all of their support over the last five years.

Ferdinand Colloredo-Mansfield, who has been serving as vice chairman of the board, will become chairman. He has been a trustee of this Hospital for ten years, and I know he is eminently qualified to serve this institution.

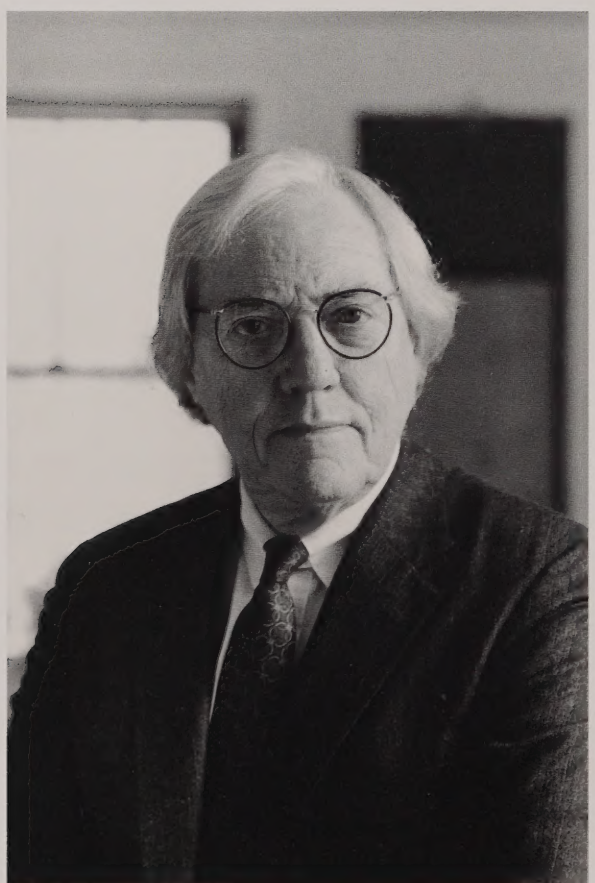
Meanwhile, I look forward to continuing as a trustee of the MGH and to my new role as president, helping to ensure that the Hospital remains a leader in patient care, education, and research. It gives me a feeling of pride to know that I am associated with this great institution.

W. Nicholas Thorndike

FEW ARE AWARE of the many important ways in which the MGH relates to communities all over the globe. Accordingly, this Annual Report for 1991 focuses on service, education, and research programs in which "the General" participates in communities close to and distant from our Boston campus.

General Director's Report

Whether it is a summer camp for needy inner city youngsters of the Boston area, or research in collaboration with international scientists, or efforts to improve health care in the underdeveloped world, I believe that each is a valid activity for any institution claiming world class status. Moreover, I firmly believe that as the MGH contributes to the improved condition of others, appreciative individuals and agencies worldwide will provide the necessary support for its essential functions.



Of course, emphasis on extramural programs is only appropriate when those constituting our primary mission continue to be strong. Accordingly, I hasten to assure the reader that the home-based MGH patient care, research, and educational programs retain their long-standing quality, vitality, and, for the most part, their forward progress. As in any dynamic institution, we face the inevitable changes in leadership that necessitate aggressive searching and recruiting. In addition, over time, some programs wane in their vitality and dynamism requiring prompt and vigorous corrective actions. In this regard, as in recruiting, the MGH has been diligent and, I am happy to report, remarkably successful. As examples of our success in renewing our professional leadership, I cite the following examples:

- Joseph Coyle, formerly distinguished service professor of child psychiatry at John Hopkins University School of Medicine, is now director of the Consolidated Department of Psychiatry, which includes the MGH, McLean, and four other area hospitals.
- Valentin Fuster, previously chief of Cardiology at Mt. Sinai Hospital in New York, has been appointed as MGH chief of Cardiology in the Department of Medicine.
- Anne Young, previously professor of Neurology at the University of Michigan, is now chief of Neurology.

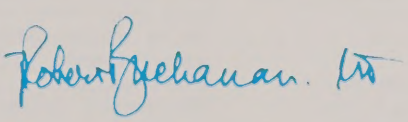
- Robert Colvin, formerly the head of the MGH Immunopathology Unit, has been appointed chief of Pathology
- W. Scott McDougal, once professor and chairman of the Department of Urology at Vanderbilt University School of Medicine, is now chief of Urology.
- Ed Harlow, from the Cold Spring Harbor Laboratory in New York, is now director of the Molecular Oncology Laboratory in the MGH Cancer Center.
- David Sachs, previously chief of the Immunology Branch at the National Cancer Institute/National Institutes of Health, is now director of the Transplantation Biology Research Center.

During 1991, the General Hospital increased admissions by 2.3 percent over 1990, managed to shorten the average length of stay from 8.67 to 8.48 days and set a goal of a further 3.7 percent increase in admissions during 1992. Significantly, during 1991 the severity of illness of the average patient climbed 2.7 percent. If this phenomenon continues for the next five years, severity of illness will have increased by an alarming 15 percent with all the associated problems of increased utilization of expensive resources.

Research support climbed to a total of $144.2 million in 1991, up from $126 million in 1990. Noteworthy is the fact that approximately 50 percent of research support now comes from the Federal government, 25 percent from the corporate sector and 25 percent from private individuals and foundations reflecting our conscious and successful efforts to diversify the sources of research funding.

Cumulative gift support for the General's continuing bed replacement and modernization program has grown from $1,264,500 in 1990 to $4,801,772 in 1991. At the same time total gifts and grants to the General Hospital for all purposes reached a new high of $130,434,571. Finally, by way of assurance, I am pleased to report that on total patient care revenues of $614,318,000 the General's earnings from 1991 operations were $1,172,000. When nonoperating income from various sources is included, the General's 1991 "bottom-bottom" line was a solid $9,194,000.

As this report is my tenth as the General Director of the General Hospital, I pause to acknowledge with gratitude the unswerving loyalty of the world's best Board of Trustees, the creative collaboration of a premier professional staff, and the remarkably dedicated and selfless support of extraordinarily able executive and management staffs. Most importantly, I would like to recognize the many other employees, donors, and supporters who have contributed to a decade of progress and institutional growth in a potentially damaging environment characterized by volatile and uncertain reimbursement for health care services and, most recently, by a transcendental economic recession.



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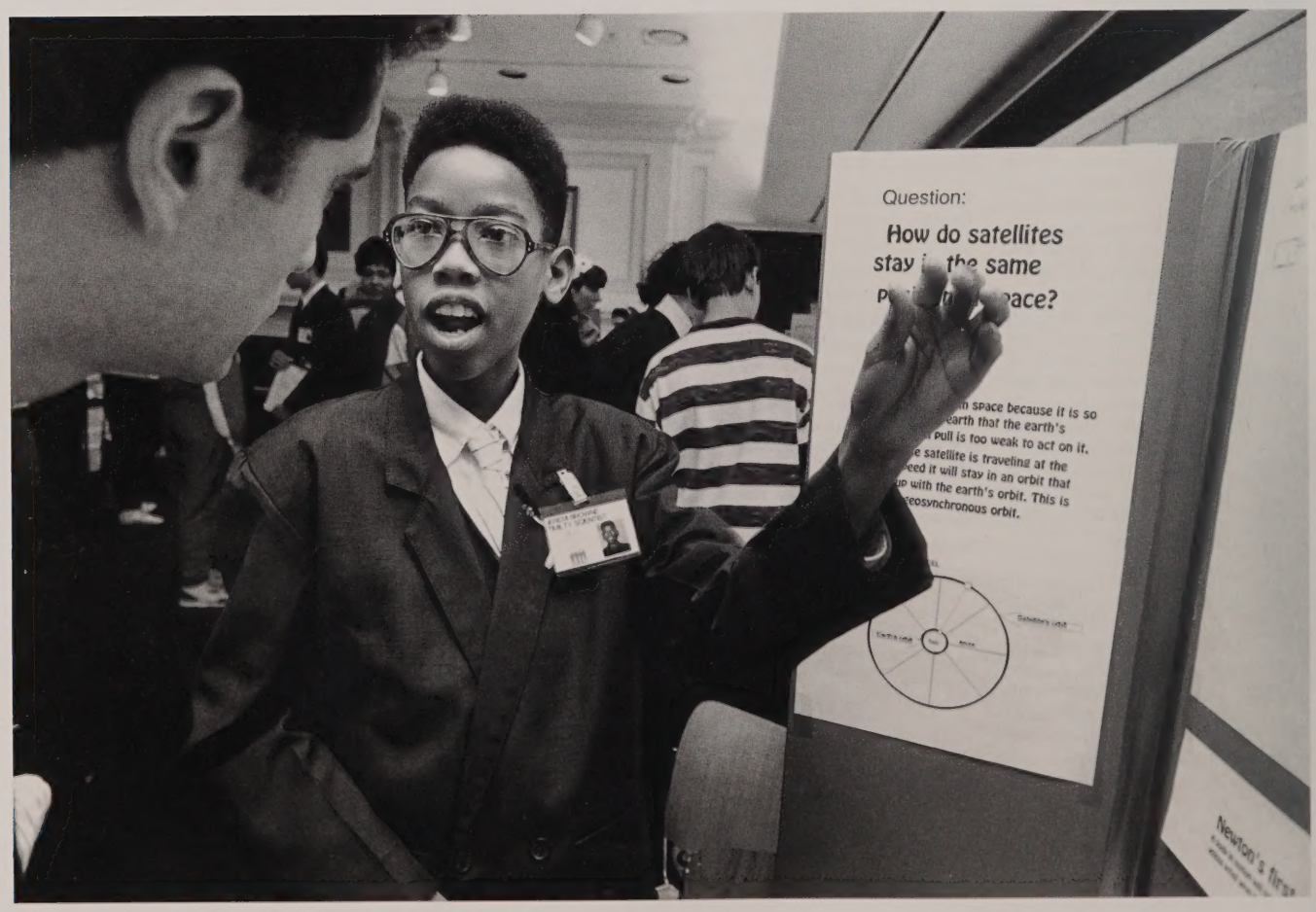
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Left: A student explains his exhibit at the MGH-Timilty School science fair.

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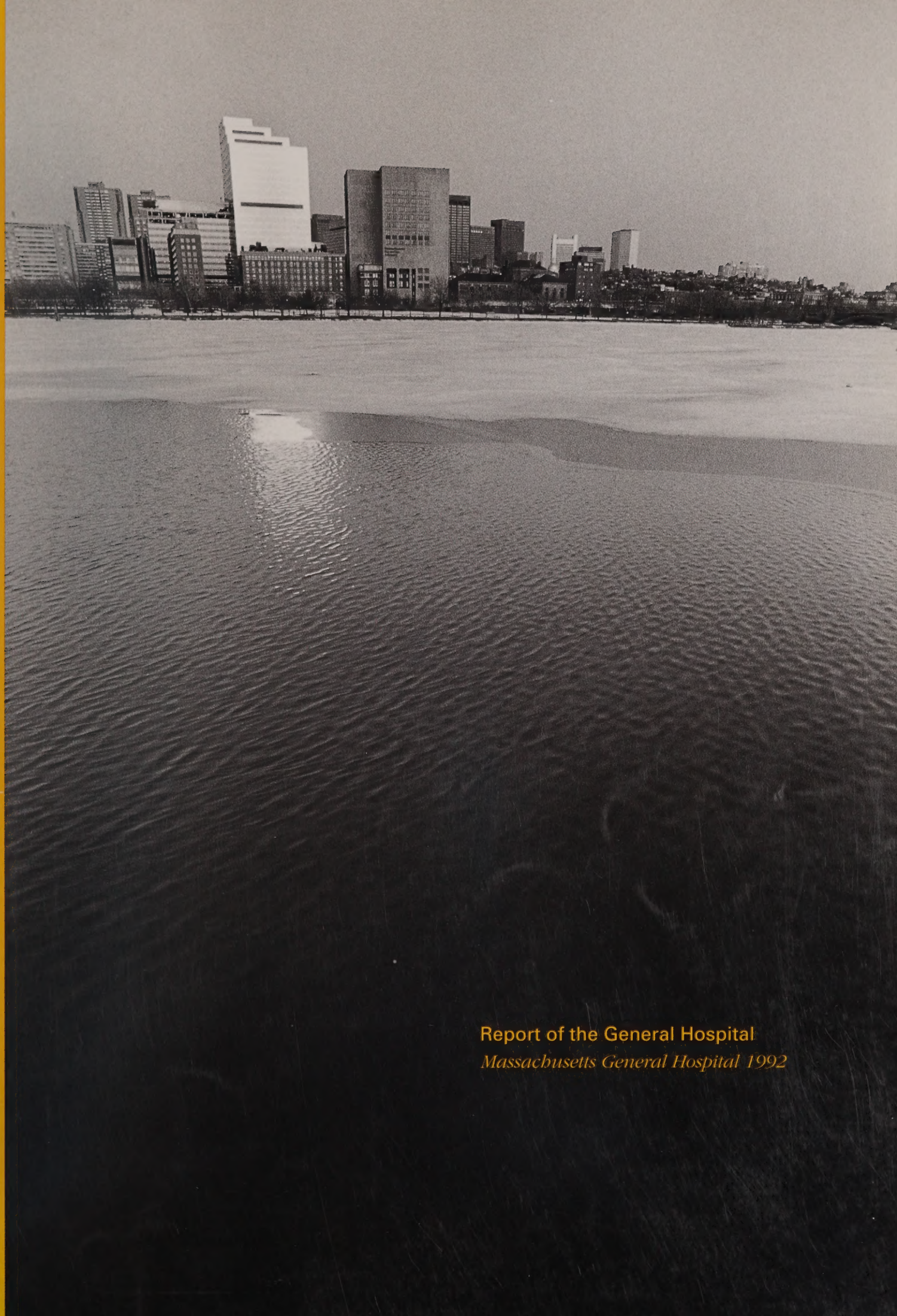

Report of the General Hospital

Massachusetts General Hospital 1992

BUILDING FOR

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THE FUTURE

AS IT REPLACES its outdated patient care facilities, the Massachusetts General Hospital is changing the landscape of the city. The Ellison Building and the new patient tower rising beside it have become landmarks on the Boston skyline. But more important are the 14,000 people who work within the hospital's walls, people who are helping to shape the future of health care.

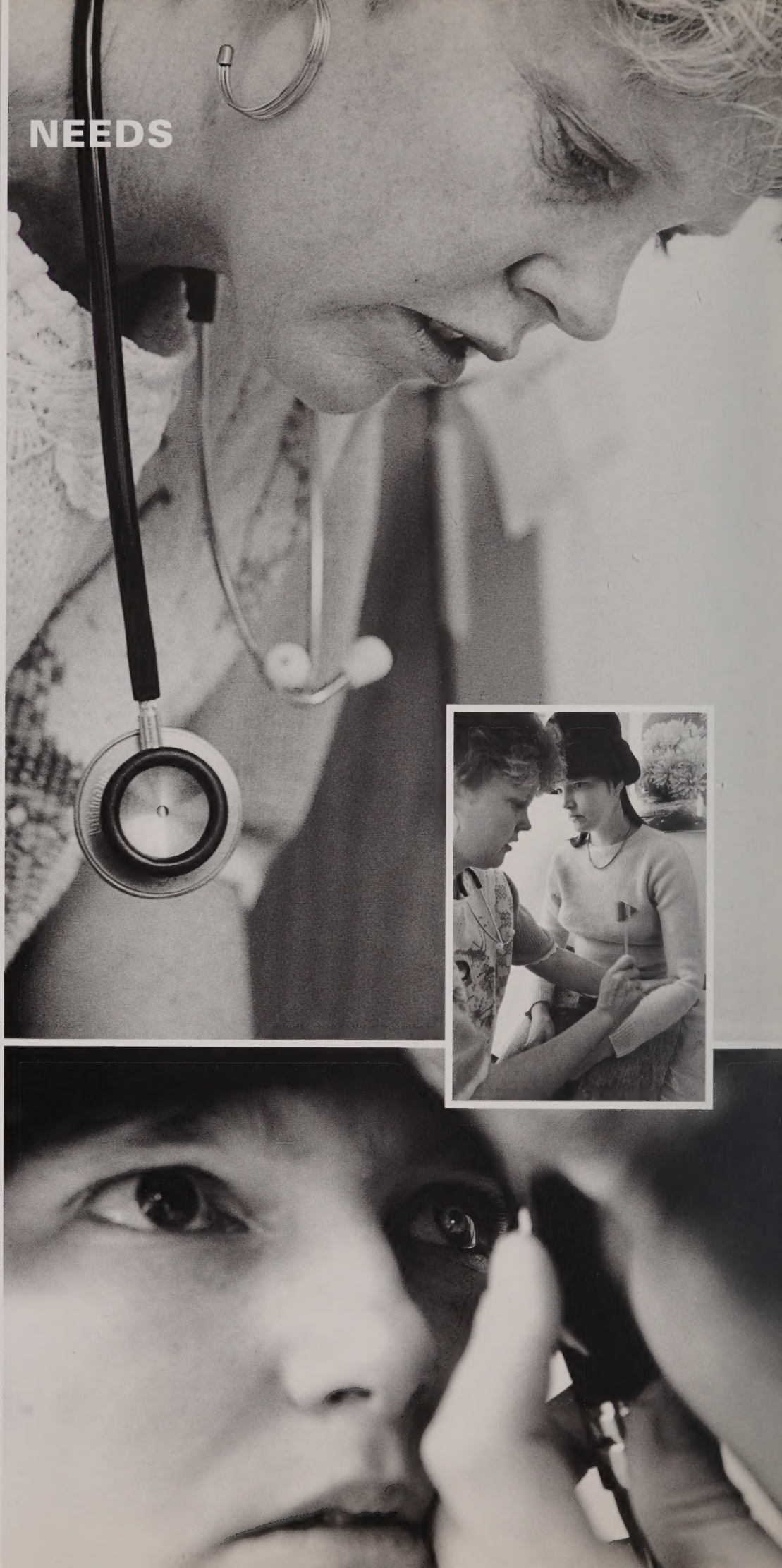
The MGH attracts people who want to make a difference. Their commitment is evident whenever a nurse sees to the injuries of a boy in the Emergency Department, a physician visits a homeless woman in a shelter, a mentor excites a teenager about science, or a young researcher wrestles with the cause of a perplexing disease.

They possess an energy and intellect that drives them to ask whether a current procedure can be improved or a new, more effective method developed. Working in collaboration with others, they become a powerful resource as the hospital seeks to provide for the health of patients throughout Boston, the state, and the country.

Today, the only certainty in the future of health care is the dizzying pace of change. The MGH is in the vanguard, forging a broad array of programs and initiatives that reach out into the hospital's many communities. In these pages you will meet a few of those who are leading the way.

COMMUNITY NEEDS

Despite increasing demands and shrinking resources, MGH physicians, scientists, nurses, and administrators work tirelessly to ensure the health of all who are in need of care. Drawing on the accumulated wisdom and knowledge of nearly two centuries of leadership in patient care, research, and teaching, the MGH is helping to shape the future of health care.

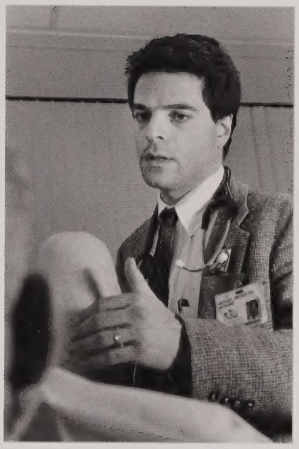


HOMELESS

THE YOUNG MAN with AIDS has been getting progressively weaker. He spends most of his time at a shelter for the homeless, not sick enough to be hospitalized. This is where Roseanna Means, MD, sees him several times a week on her regular rounds of the Boston shelters. Recently, the young man bought a child's paint-by-number set, painstakingly completed all of the paintings, and gave them to Dr. Means. "I cried when I saw them," she remembers. "He is so weak and this must have taken him so long to do. Time is all he has left, and that is what he chose to give me."

This young man is one of many homeless people cared for by the physicians, nurses, and social workers of the Boston Health Care for the Homeless Program (BHCHP), which is led by MGH physician James O'Connell, MD. As part of this effort, the MGH Medical Program for the Homeless works under the direction of Michael Bierer, MD, to assist in the care of homeless people who come to the hospital. Learning from and working in close collaboration with area shelters, Boston City Hospital, and a variety of agencies, the MGH project — the only such program for the homeless at a private Boston hospital — strives to meet the special needs of this growing segment of the population. Today, Drs. Means and Bierer continue to expand the scope of the MGH program's services, seeing patients at local shelters, "on their own turf," in the words of Dr. Bierer. "If you can't *talk* to patients in an atmosphere where they feel safe and free to tell their stories, you'll never be able to help them," says Dr. Means. "I started out spending one morning a week visiting patients at the homeless shelters; now I'm there three times a week." Through her increasing visibility in the shelters, Dr. Means has attracted a following of homeless women patients. "They feel more comfortable seeking medical care and advice from a woman doctor," she says.

"These people are not anonymous," says Dr. Means. "They have names, faces, personalities, histories. We have a mission as doctors to take care of everyone."



The MGH Medical Program for the Homeless is part of BHCHP, a city-wide network of care providers in shelters, soup kitchens, and welfare hotels. MGH physicians see homeless patients in all areas of the hospital, including the Medical Walk-in Clinic, where the homeless clinic operates. Increasingly, however, doctors like Roseanna Means, MD, (left) and Michael Bierer, MD, (above) leave the hospital to visit patients at shelters and soup kitchens, making housecalls to those without homes.

CLINICAL DECISION-MAKING

As Americans search for ways to widen access to medical services and reduce costs without compromising quality, the MGH contributes to the national debate on health care reform through research, collaboration with other medical centers, and improvements to patient care within the hospital.

"Health policy research is part of the work of medicine. It helps us understand how medicine affects society, and how society affects medicine," says David Blumenthal, MD, chief of the new MGH Health Policy Research and Development Unit.

The new unit is one of several initiatives within the hospital's Medical Practices Evaluation Center. Another project, led by Albert Mulley, Jr., MD, chief of the General Internal Medicine Unit, uses interactive video as a tool to help patients learn about their illnesses and various options for treatment. A woman with early stage breast cancer, for example, can review statistical information on the success rates of different treatments and see interviews with patients who describe their experiences with each option. "As a result of watching the video, one woman may decide she would rather go through radiation therapy than lose her breast," says Dr. Mulley. "Another woman may feel, 'that breast betrayed me.' For her, reduction of risk — even at the cost of removing the breast — is of utmost importance. Both decisions are valid."

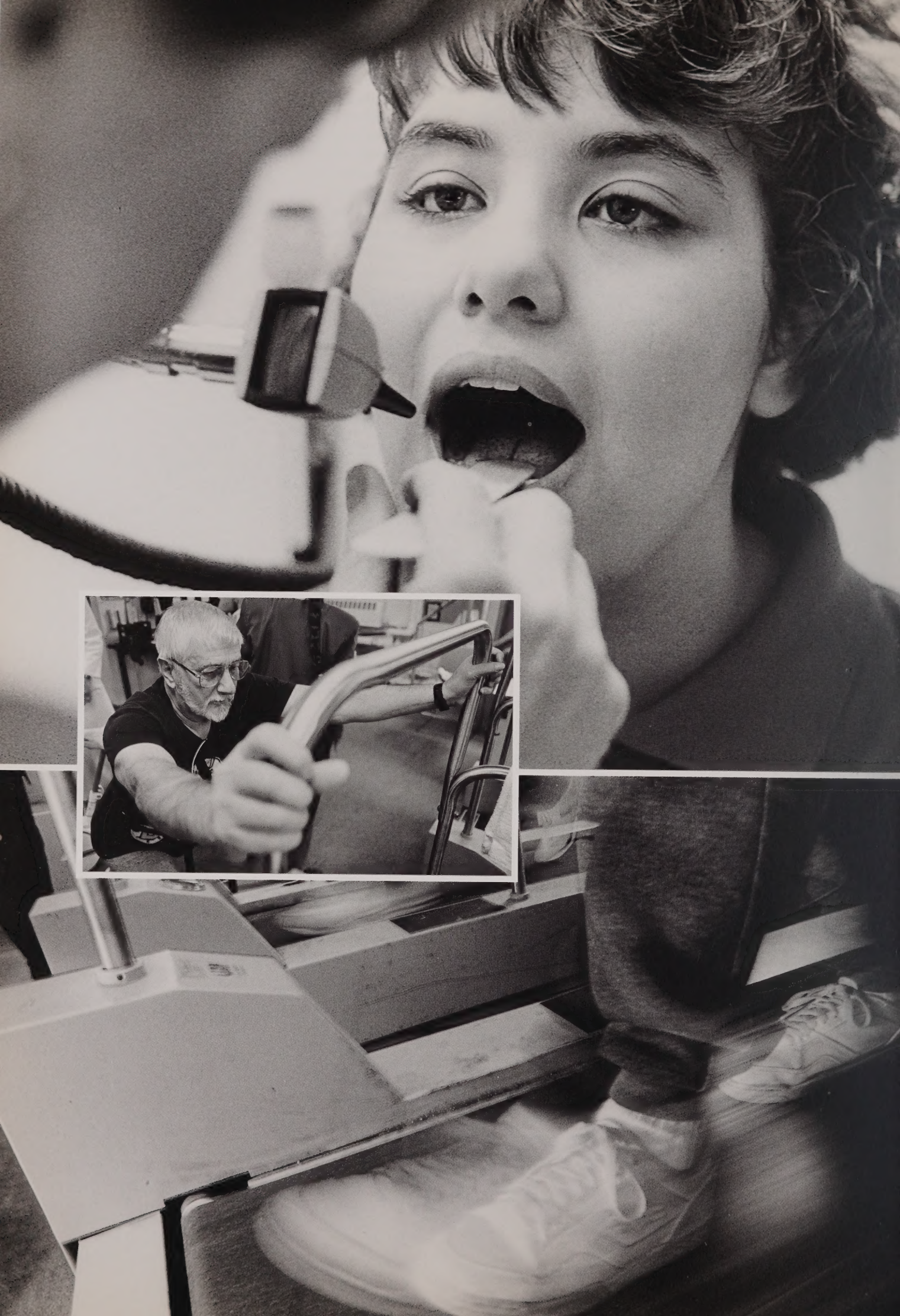
Stephen Curry's lower back pain was so severe that for several months he had to work at a stand-up desk. While doctors were trying to pinpoint the cause of his pain, Mr. Curry (seated at right, with Dr. Mulley) participated in an MGH pilot study for the development of an interactive video on lower back pain. "The process helped me figure out what was important in my life," says Mr Curry. "It relieved some anxiety to hear the actual experiences of other patients with the same condition." After corrective surgery, Mr. Curry's pain is gone. Dr. Mulley, who helped develop the video, meets regularly with his colleagues in the Medical Practices Evaluation Center (above).

Dr. Mulley and his colleague Michael Barry, MD, believe that the medical profession should not only build and maintain a scientific knowledge base of what works and what does not, but should also use that knowledge to help people make their own decisions about what treatment is best for them.

In collaboration with Dartmouth Medical School, Dr. Mulley's group has developed interactive videos on prostate disease and mild hypertension, as well as early-stage breast cancer and lower back pain.

"Patients are our most important 'customers,'" asserts Peter Slavin, MD, director of Clinical Data Analysis for the Center. Dr. Slavin oversees the collection and analysis of data to improve the quality and efficiency of care delivered at MGH. One area under study is the length of time that patients spend waiting for various services to be delivered. Other efforts include the application of business-style "total quality management" techniques to the hospital setting and the collection of outcomes data comparing the treatment results of cardiac patients at 12 medical centers (including the MGH) across the country.

The Main Decision:
Surgery or Non-surgical
Treatments



SCIENTIST AND HUMANIST RENÉ DUBOS paraphrased an old maxim to describe the role of the physician in our age: "To sometimes cure, often help, always console — and, whenever possible, prevent." Through education, research, community involvement, and, where necessary, political action, MGH health care professionals promote health and prevent disease.

In Chelsea, the MGH puts health care where adolescents can access it most easily. "Teenagers don't want to walk into a waiting room where their mother's best friend might be sitting," says Beth Beaumont, RN-C, MS, nursing director of the MGH Chelsea Memorial Health Center, "so we set up a satellite health clinic right in Chelsea High School." Now, during the school day, students can walk into their own clinic and talk to Gail Gall, RN-C, ANP, about anything that is on their minds. She counsels teenagers about such topics as HIV, substance abuse, domestic violence, and pregnancy, and helps coordinate AIDS education in the classrooms.

Back on the MGH campus, one of the hospital's more far-reaching programs seeks to prevent heart disease. "We are looking beyond the traditional boundaries of medicine to find ways to reduce cardiovascular risk," says Richard C. Pasternak, MD, director of Preventive Cardiology. Behavioral medicine/stress reduction, for example, helps patients through mind-body techniques, meditation, and discussion of social isolation with psychiatrists, psychologists, and nurses. Other efforts include cardiac rehabilitation services, nutrition counseling, and a weight loss program. Future plans include a program for hypertension. Preventive cardiology also has a robust research component, investigating ways to reduce cardiac risk, including the use of new agents to lower cholesterol.

Outpatient Visits
MGH Health Centers
Fiscal Year 1992

Bunker Hill Health Center	46,419
Chelsea Memorial Health Center	85,536
Revere Health Associates	24,809
Total	156,764

For people who smoke but want to quit, the new MGH Quit Smoking Service tries to ease the ordeal by providing nicotine patches and behavioral counseling. Nancy Rigotti, MD, director of the service, and members of the Preventive Cardiology Department are also working to weaken smoking's hold on society. MGH physicians helped to pass a recent state referendum increasing the tobacco excise tax, and Dr. Rigotti is working with the city of Somerville to evaluate a tough new ordinance targeting stores that illegally sell cigarettes to children.

PREVENTION

Nearly two thirds of the students at Chelsea High School learned Spanish as their first language. But they have no trouble communicating with Gail Gall, RN-C, ANP (above, opposite page, top). Ms. Gall, who staffs the school's health center for MGH, spent two years working in Honduras as a member of the Peace Corps and speaks Spanish fluently. "AIDS is a death sentence," says Ms. Gall bluntly. "The students trust me to give them straight answers about how to protect themselves. I tell them that everything that goes on here is strictly confidential. This gives them permission to talk, to feel safe." Meanwhile, patients in the MGH Cardiac Rehabilitation Unit learn to live healthier lives and reduce their risk of disease (opposite page, inset, bottom).

YOUTH

ANDREW MERCURY was determined to make it on his own. But living alone in an unheated apartment in January was taking its toll — deeply depressed and weak from not eating, he was desperate. "The hardest thing for me was to swallow my pride and ask for help," recalls the 19-year old. Fortunately, he had someone to turn to: MGH neuroscience researcher Barry Kosofsky, MD, PhD, his mentor in a program called Project Protech, which trains high school juniors and seniors for careers in health care.

Project Protech helped Drew get back on his feet. Today, he has graduated from high school and is working in anesthesia clinical engineering, as well as in the laboratory. He has been accepted to the Wentworth Institute, where he plans to study biomedical engineering. "Before I didn't know why I had been put on earth," says Drew. "But getting the help of so many wonderful people made me realize I have to give something back. Now I believe my purpose is to help people get better."

Project Protech, which is managed at the MGH by the Human Resources Office, involves a collaboration among the seven Boston teaching hospitals and three Boston high schools. The innovative school-to-work transition program combines classroom time, both at school and within the hospital, with hands-on experience working in the hospital. Some 50 to 100 MGH employees volunteer their time to the 30 public high school juniors and seniors participating in the four-year, year-round program. "This program gives me the options kids who have a regular family would have," says Andrew Mercury (right), who is proud of the fact that he has earned the opportunities he has received. "Now I feel I can call the shots and go for what I want. I know that whatever I do, I can give it my best."

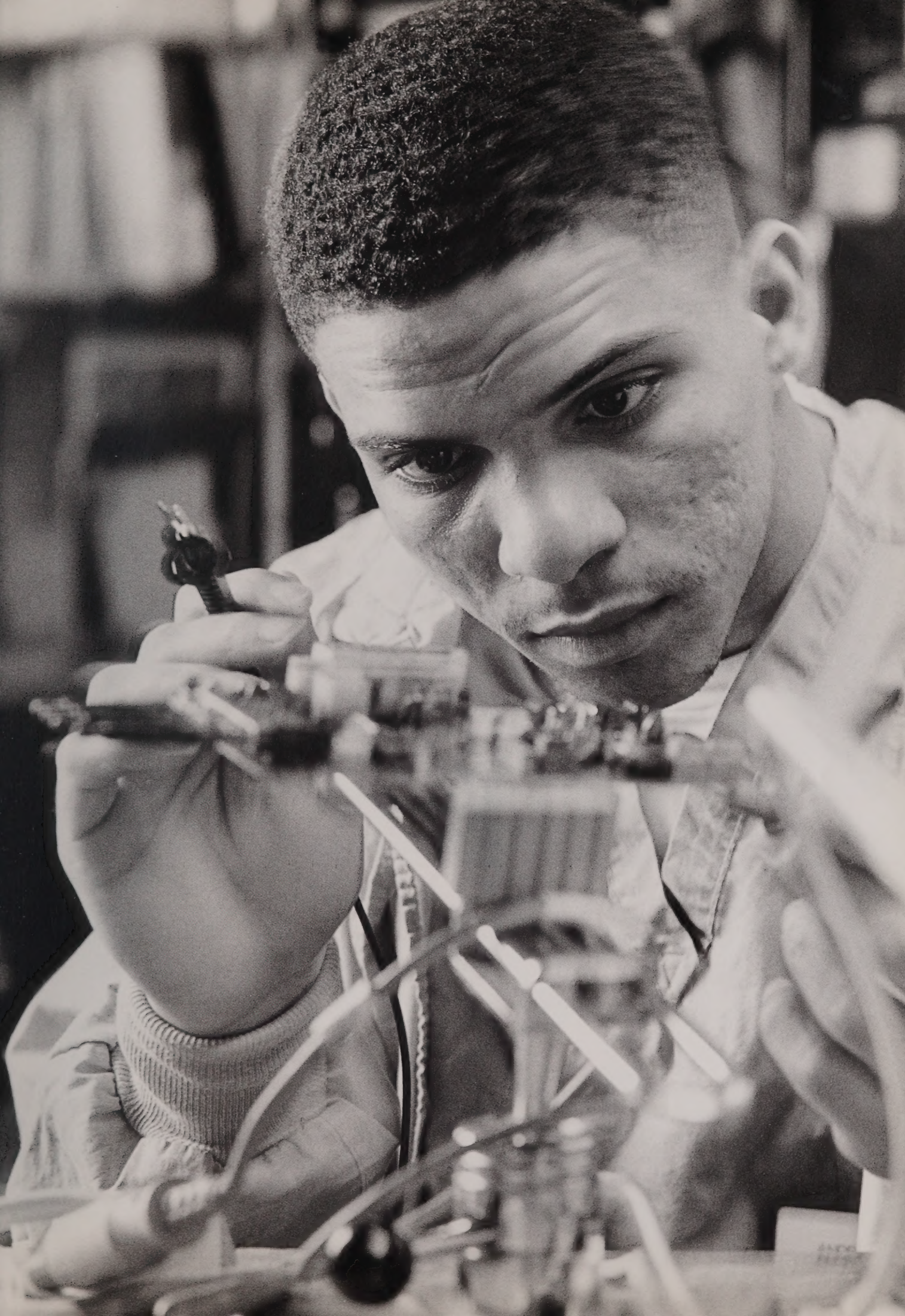
More than 30 years ago, the MGH began collaborating with public schools in Boston and surrounding cities to develop educational programs for youths. Today, the MGH works with local schools and community colleges with three goals in mind: to improve basic education; to offer underprivileged youths opportunities for career development and work skills training; and to improve minority representation in science and medicine.

Among the MGH initiatives is a collaboration that matches students from the Timilty Middle School in Roxbury (left) with MGH volunteers. Summer camp programs for students from the Timilty and the Dearborn schools teach kids how to use the resources of the city and its environs. The MGH also has programs for high school dropouts, special needs children, and pregnant teens.

Camp Bunker Hill is a summer program for children with behavior problems run by the MGH Bunker Hill Health Center with agencies and schools in Charlestown. Many of these youngsters have been physically or sexually abused or have a parent involved with drugs or alcohol.

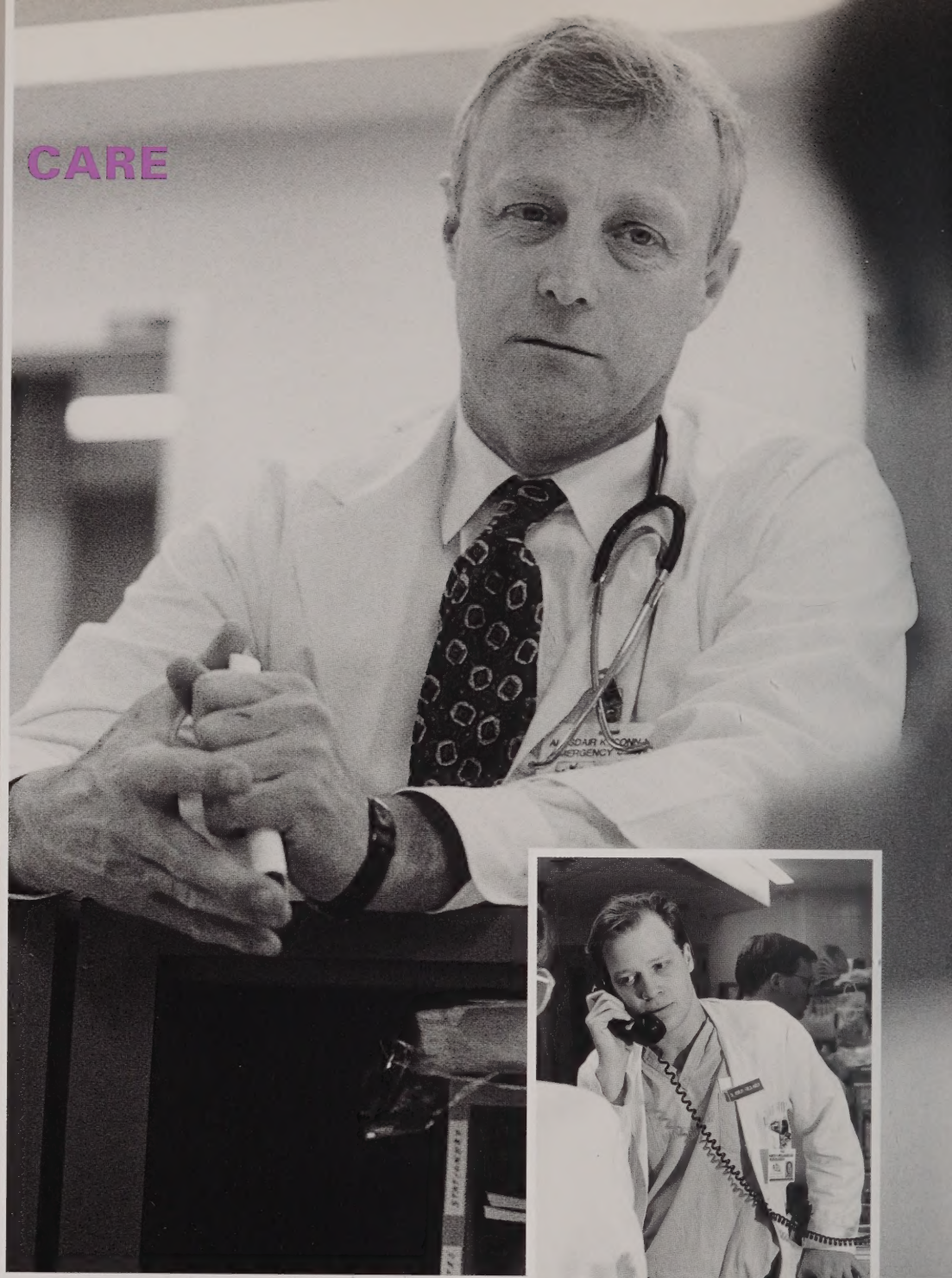
At the other end of the spectrum, programs such as the Research Apprentice Program, directed by the MGH Research Affairs Office, focus on encouraging exceptional minority students to consider careers in science and medicine.

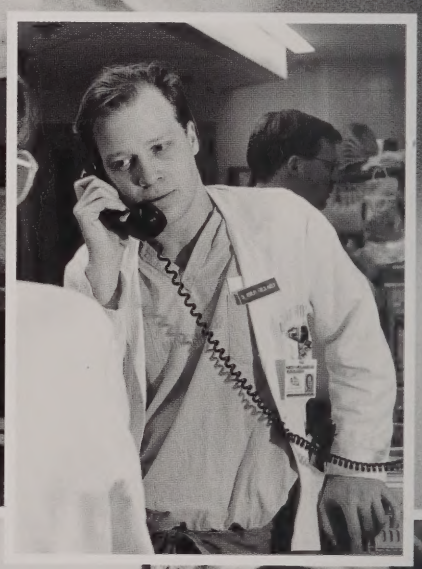
"Our goal," says Stephen Kauffman, associate general director, "is to help expose kids to a set of values and prepare them to take advantage of opportunities that might arise."



PATIENT CARE

Clinicians at the MGH are always restless — seeking answers to their questions, they are in continual pursuit of new or improved ways to care for their patients. But technological advances alone are not enough. MGH physicians, nurses, and others work in concert across disciplines to ensure that new procedures also enhance patients' physical and psychological well-being.





JEFFREY CUNNINGHAM was 13 years old when the car in which he was riding was struck by a construction truck on a Cape Cod highway last summer. When local firefighters arrived on the scene and realized the severity of Jeffrey's injuries, they immediately called MedFlight, the emergency helicopter service established by the MGH and a consortium of Boston hospitals. Less than an hour after the accident, Jeffrey was immobilized and in flight, on his way to the MGH.

"We know that between 20 and 30 percent of people who die from accidents might have survived if they were taken immediately to the facility best equipped to help them," says Alasdair K.T. Conn, MD, director of MGH Emergency Services (near left). "For example, do all burn and trauma patients get taken to fully equipped burn and trauma centers? Do they get there during the first hour after the injury, the so-called 'golden hour?'"

Dr. Conn was recently appointed emergency services trauma director for Massachusetts and is helping to craft legislation that will mandate an integrated emergency services network for the state, coordinating ground ambulances, helicopters, paramedics, and emergency physicians, to ensure that trauma patients get the care they need in the pre-hospital phase, and are then taken to the most appropriate facility.

When Jeffrey Cunningham was rushed into the MGH Emergency Department, a highly trained trauma team was waiting for him. "We have set up a system that insures the presence of a trauma surgeon at all times in the Emergency Department," says Dr. Conn. "If we know that a critically ill person is arriving in 4 minutes, for example, the surgeon should be *here*, rather than being on call." This system will become even more necessary after the planned opening of the hospital's own helicopter landing pad atop Tower II.

Jeffrey is now back at school. "He still has some neurological problems, for which he is receiving therapy," says his mother, Linda Cunningham, "but we are blessed that he's alive."

Outpatient Visits*
Fiscal Year 1992

494,565	Within Route 128 area
75,989	Within greater Route 495 area
13,091	Remainder of state
26,466	Remainder of U.S. and international
1,750	Unknown origin
611,861	Total

**includes Emergency Department but excludes some 200,000 visits to MGH-affiliated physician practices*

TRAUMA

Nearly 75 percent of emergency patients admitted to the MGH are from the immediate Boston area. To respond smoothly and efficiently to the demands of a Level I trauma center that treats some 66,000 patients each year, the Emergency Department is in the final stages of a complete renovation. It contains mini-operating rooms, specially equipped cardiac bays, a chemical and radioactive burn rescue room, and a sophisticated computer system to monitor the progress of all patients on a minute-to-minute basis. In the event of a disaster involving many victims, the new Emergency Department can be quickly transformed to receive large numbers of critically ill patients at one time.

REBUILDING THE MGH

The second patient tower, which will complete the hospital's bed replacement program, is now rising alongside the Ellison Building. Among other services, the building will house the inpatient psychiatric unit, enabling it to move out of the 172-year-old Bulfinch Building, and the hospital's obstetrics unit, scheduled to open in late 1994 or early 1995. On the roof, a heliport will cap efforts to provide patients with an efficient, state-of-the-art emergency department.

TINY INFANTS in their bassinets wedged between the equipment that monitors their heart beats; patient rooms so small that a nurse needed 10 minutes to remove the furniture so she could wheel in the equipment to assess a patient's circulation — since the demolition of the 53-year-old Baker Building and the opening of the Ellison Building three years ago, these once familiar scenes of the MGH are gone.

More than a decade ago, the hospital initiated a long-term strategic plan to renovate where possible and replace if necessary the hospital's outdated inpatient facilities. The Ellison Building and renovation of the White, Gray, and Bigelow Buildings are the physical manifestations of this plan. The second patient tower, now under construction, will complete the centralization of the hospital's inpatient facilities into one interconnected complex.

As we head toward the 21st century, "the patients we care for will be older and acutely ill, and their hospital stays will be shorter," says Jeanette Ives, RN, MS, director of nursing support services. The hospital's bed replacement program will provide facilities that meet state and federal guidelines, and meet the increasing demands of evolving technology and greater efficiency. Committees that included physicians, nurses, therapists, and environmental service, dietary, maintenance, and administrative staff assisted in the planning of the new patient care units, resulting in facilities designed by those who work there to meet the needs of patients, their families, and caregivers.

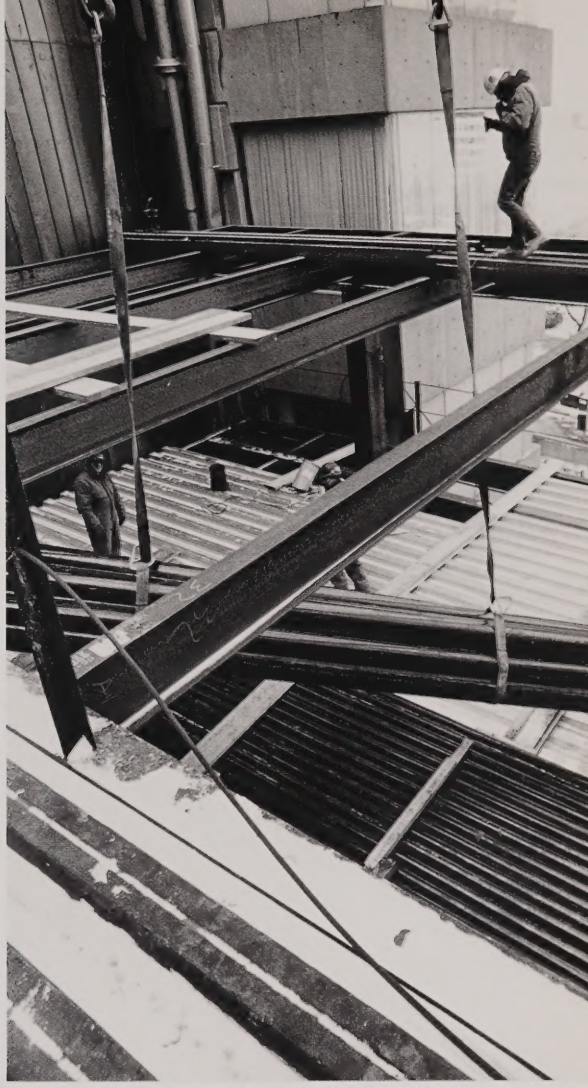
Bed Replacement Program
1985-1992

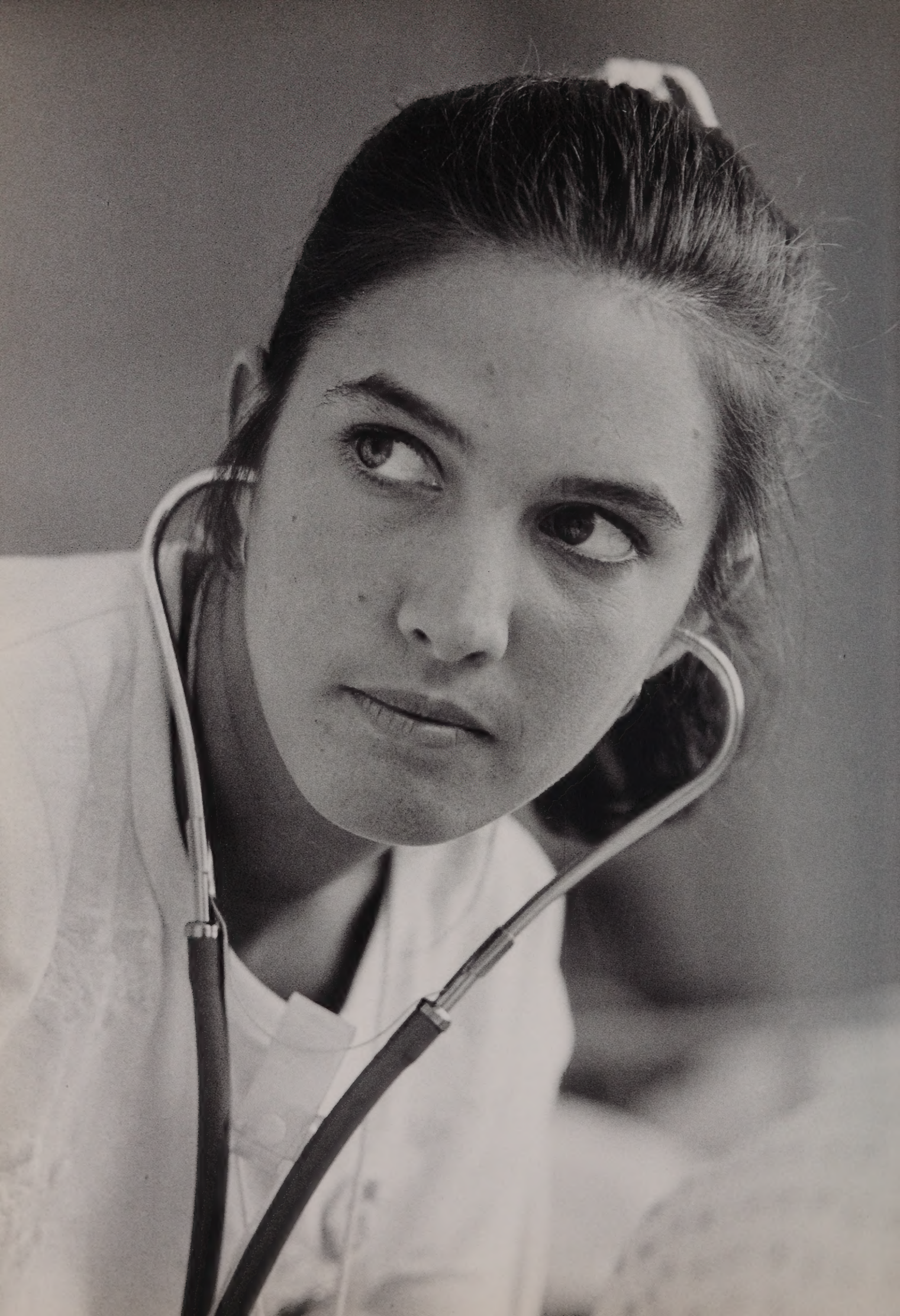
Employed over 100 contractors and subcontractors (90% state-based companies and 96% New England-based) representing the employment of some 1,800 tradesmen and professionals

Other Renovation Projects
1985-1992

Employed over 90 contractors and subcontractors (90% state-based and 95% New England-based). Average number of projects per year: 80-90.

In addition, the hospital has initiated a variety of efforts to both decrease costs and improve the environment. These include building improvements to increase energy efficiency, campus-wide recycling efforts, and construction of a medical waste incinerator. The incinerator cleanly burns more than 800 tons of medical waste each year, exceeding standards set by the Massachusetts Department of Environmental Protection. "We don't have to shudder when needles wash up on beaches," says Jeff Davis, assistant general director for support services, "because we know that the hospital's medical waste never leaves the campus."





IN TODAY'S operating room, nurses prepare not only scalpels and scissors — the traditional tools of surgery — but also fragile fiber optic and video equipment, which surgeons often use to see inside a patient's body. Along with technologists, nurses calibrate lasers, perform safety checks, and repair equipment. "As health care technology changes, so must the support systems around it," says Edward Coakley, RN, MSN, clinical director of operating room nursing. "The practice of nursing is continually evolving."

Nurses have traditionally prepared patients and their families emotionally and physically, guided patients through recovery and back to health, and taught them how to care for themselves when they return home. These activities are becoming ever more complex. "In the United States, we are very advanced in the use of medical technology, but we need to focus more on preparing patients for that technology," says Glenys A. Hamilton, DNSc, RN. Dr. Hamilton is coordinator of the newly established MGH Center for Research Based Practice in the Department of Nursing.

NURSING

The center seeks to provide nurses with the resources to do research and to build a centralized database of nursing-related knowledge that can be used in making clinical decisions. A seasoned nurse can look at an infant in the recovery room and decide instantly that the patient is about to crash, long before that becomes evident through clinical tests. Much of nursing practice is visceral, learned over years of experience working with patients. "The center will help us develop a scientific base for our clinical practice," says Sally Millar, RN, MBA, director of nursing information systems.

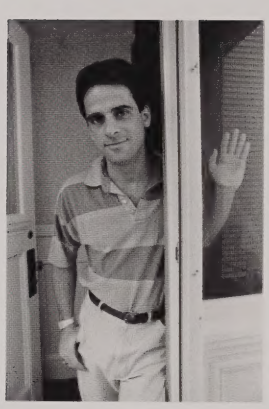
Inpatient Discharges
Fiscal Year 1992

20,151	Within Route 128 area
8,199	Within greater Route 495 area
2,751	Remainder of state
5,100	Remainder of U.S. and international
137	Unknown origin
36,338	Total

Current research projects in the Department of Nursing include monitoring outcomes of procedures to prevent bed sores and other patient skin problems, studying ways to prevent slips and falls in the elderly, and defining the ability of patients to properly care for themselves upon discharge. Nurses are also working on a project to make computerized guidelines of care available on patient care units, and are designing a computerized staff scheduling and patient classification system.

"As the environment of health care changes, we need to analyze the work of nursing to develop new models of accomplishing that work, and determine who should perform it," says Joan B. Fitzmaurice, RN, PhD, director of quality assurance, research and development in the Department of Nursing. "In the operating room and throughout the hospital, we need to assure that health care both meets the patients' needs and is delivered in a cost-effective manner."

MINIMALLY INVASIVE THERAPY

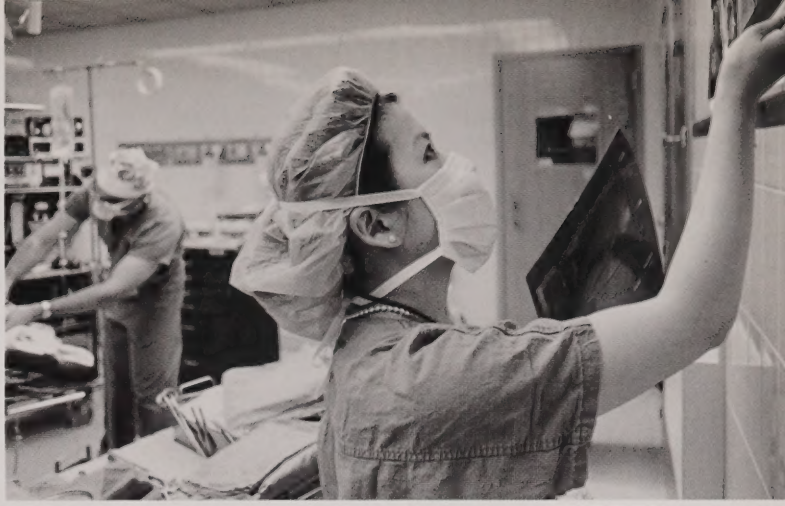


"I felt like I was being stabbed in the stomach after almost every meal," says Bertram Kline, (above) describing the pain that had plagued him for years prior to his surgery at MGH. Mr. Kline is one of a growing number of MGH patients who have had their hiatus hernia repaired using a laparoscope in a procedure similar to that pictured at right. "By bringing together clinicians and researchers from diverse specialties and allowing them to 'cross-pollinate' each other," says David Rattner, MD, (operating at right) "we are able to focus the research, developing new applications for existing technologies."

If Bertram Kline, Jr., had needed surgery to repair his hiatus hernia just one year ago, he would have faced a 10-day hospital stay, considerable pain, possible breathing complications, a large chest incision, and a lengthy recovery. But last November, he checked into MGH on a Tuesday, had surgery, was discharged the following Friday morning, and was headed south on vacation within a few weeks. His "incision" consists of a few, faint, buttonhole-sized scars on his abdomen.

To repair Mr. Kline's hiatus hernia (which causes severe heartburn and damage to the esophagus) surgeons in the newly created MGH Center for Minimally Invasive Therapy modified a standard operation by using minimally invasive techniques. The method provides the same benefits, with little or no pain. "We insert a laparoscope (a type of telescope with a tiny video camera attached to the end) into the abdomen. We then insert four trocars (surgical instruments the size of a pencil) into the abdomen through punctures. We perform the surgery with the trocars, while watching the images relayed by the video camera on a TV screen," explains David Rattner, MD, Mr. Kline's surgeon and the director of the Center for Minimally Invasive Therapy. The technique is also used for gall bladder removal, bowel resections, and detection of the spread of pancreatic cancer. For patients who need these procedures, it means fewer incisions, less scarring, shorter hospital stays, and less pain than would have been possible using traditional surgical methods.

Developing this technique is one example of how the center is seeking to deliver high quality patient care more efficiently and with fewer physical and financial costs. The center brings together experts in lasers, radiology, and various medical and surgical specialties to discover, develop, and evaluate new ways to care for patients with less invasive techniques. The strength of the center lies in this broad cross-disciplinary participation. "Our ties to the Laser Center and the Center for Imaging and Pharmaceutical Research bring a tremendous depth of technology to our patient care," says Dr. Rattner. "We will also examine each application of these techniques to determine the cost-efficiency and benefits to the patient."



EXTENDING HORIZONS

Architecture teaches us that human beings have a universal need to look out over open space, to the farthest horizon. For many at the MGH, this yearning becomes an eagerness to explore beyond the horizon. The challenge might lie in deciphering a cell's genetic mechanisms or in puzzling out a new treatment for a disease. Whatever the questions that drive them, these creative minds are extending the horizons of medical knowledge.

FIVE YEARS AGO, Jennifer Aszling (left) was "desperate and terrified." She was suffering from kidney failure, near blindness, memory problems, and fatigue — all the result of the diabetes that had been diagnosed when she was 12. In the United States, diabetes is the single greatest cause of new onset blindness in adults, renal failure leading to kidney dialysis or transplantation, and amputations. It is also a major contributor to heart disease.

In January 1988, an MGH surgical team, led by A. Benedict Cosimi, MD, and Hugh Auchincloss, MD, operated on Ms. Aszling, simultaneously giving her a new kidney and pancreas, the organ that produces insulin. Since then, she reports, the quality of her life has improved dramatically. She works full time again at the MIT List Visual Arts Center and has travelled to Europe. "And," she smiles, "my diabetes is gone."

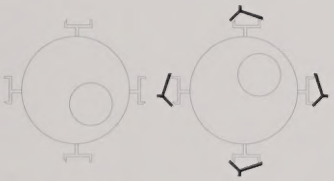
DIABETES

For the past decade, the MGH has been in the forefront of developing innovative treatments for diabetes, including intensive insulin injection regimens, the use of external — as well as surgically implanted — insulin pumps, and the transplantation of whole organs.

Yet each available treatment option has drawbacks. Use of insulin involves constant monitoring of blood sugar by the patient and does not eliminate the possibility of complications. Although the MGH has one of the most successful pancreas transplantation programs in the world, the technique is only used for severely ill patients and involves a long wait for a donor, as well as a life-long dependency on medications that suppress the immune system to prevent organ rejection.

"The future of diabetes treatment is in islets," says Joseph Avruch, MD, chief of the MGH Diabetes Unit. "It is important both to stop the autoimmune destruction of islet cells and replace islets already lost." Located in the pancreas, islet cells secrete the insulin necessary for the body to metabolize sugar. "Our goal is to transplant healthy islet cells — which would then take over insulin production — into people with diabetes," says Denise Faustman, MD, PhD, of the MGH Diabetes Research Laboratory. "The challenge is to isolate enough cells to be transplanted and then ensure that they are not destroyed by the recipient's immune system." Dr. Faustman has accomplished this in the laboratory, isolating human islet cells and transplanting them successfully into mice. "If our laboratory results are replicated in clinical trials," says Dr. Faustman, "people with diabetes would no longer need to take insulin."

On the surface of donated islet cells are molecules called antigens that will trigger a transplant recipient's white blood cells (lymphocytes) into attacking the "foreign" cells. Denise Faustman's strategy to avoid rejection involves attaching fragments of the recipient's own proteins to the transplanted cells in order to "mask" them, eliminating the need for immunosuppresive drugs. "Compared with the major surgery required for pancreas transplantation," says Dr. Faustman, "the injection of less than a teaspoon of islet cells is a relatively easy procedure."



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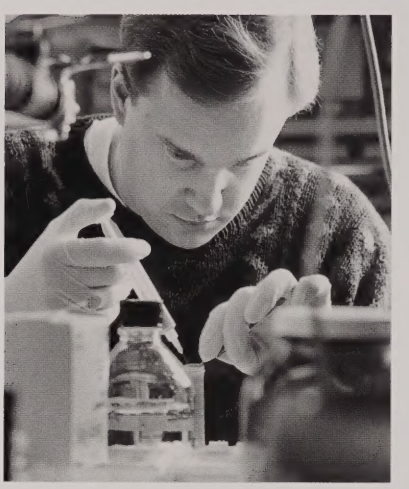


GENES

Basic research is a collaborative process that brings together individuals from different institutions and different disciplines. In seeking to identify the genetic mechanisms that cause inherited neurologic disease, Robert H. Brown, Jr., MD, PhD, (right inset) has established connections with colleagues within the MGH and across the country. Just a few floors above Dr. Brown's laboratory, Robert Tepper, MD, (opposite page, top left) and his colleagues in the MGH Cancer Center are working to stimulate the body's own natural defenses in order to treat cancer. They believe that activating the production of cytokines may not only combat the primary tumor but, in some cases, may stimulate an immune response that inhibits tumor growth elsewhere in the body as well, almost like a "vaccination" against cancer.

RESEARCHERS ENVISION a day, not far off, when gene therapy will become an effective treatment for a host of diseases. For example, basic research has uncovered a gene that causes muscular dystrophy. Armed with that knowledge, a team of researchers in the MGH Neuroscience Center, led by Robert H. Brown, Jr., MD, PhD, are harvesting muscle cells from normal donors and injecting them into patients with Becker muscular dystrophy. The hope is the cells with the normal gene will grow and ultimately compensate for the abnormal cells. This is the first time the technique has been tried in adults with this form of the disease.

In addition to replacing a malfunctioning gene with one that works, gene therapy can also be used to cause cells to self-destruct, making it a potent weapon against such life-threatening diseases as cancer. In laboratory tests, Robert Tepper, MD, and colleagues at the MGH Cancer Center have engineered a genetic fragment designed to penetrate tumor cells and cause them to release natural proteins called cytokines. These cytokines attract the body's own white blood cells, which, in turn, attack and kill the cancer cells. In one application, the researchers are working closely with MGH neurosurgeons, studying how to use cytokines directly at the site of surgically inaccessible tumors.

MGH Research Funding
Fiscal Year 1992

$85,053,326	Government
46,575,450	Industry
9,099,912	Foundations
20,895,218	Endowment and other
$161,624,407	Total

Genes can also help predict where disease will strike. Stephen Friend, MD, PhD, head of the MGH Genetic Risk Evaluation Laboratory, is collecting blood samples from hundreds of women who were diagnosed with breast cancer before age 40. Almost half of the women who develop cancer at this age have a genetic defect that predisposes them to the disease. The DNA extracted from these samples will become the first genetic "reference library" for breast cancer, helping physicians identify women who are at high risk so they can be monitored and given early, perhaps life-saving, treatment. In addition, if scientists suspect a newly discovered gene defect might be implicated in breast cancer, they can check the genetic library to determine how often that defect appears among women who have actually developed the disease.

Often, the primary threat to cancer patients is not the original tumor, but the metastasis, or spread, of the cancer throughout the body. "Tumor cells are clever," says Tayyaba Hasan, PhD, (right) leader of a research team studying the use of lasers in cancer treatment. "They don't look much different from normal cells." This makes developing treatments that avoid the toxic side effects of traditional chemotherapy a particular challenge. "We envision a time when we can insert optical fibers into a patient through a laparoscope," says Dr. Hasan. "Using laser light, we may be able to deliver treatment precisely to where it is needed."

LIGHT

HARBORING SIMULTANEOUSLY the powers of destruction and healing, light can have a powerful effect on living tissue. Researchers at the MGH Wellman Laboratories of Photomedicine are probing the therapeutic potential of lasers.

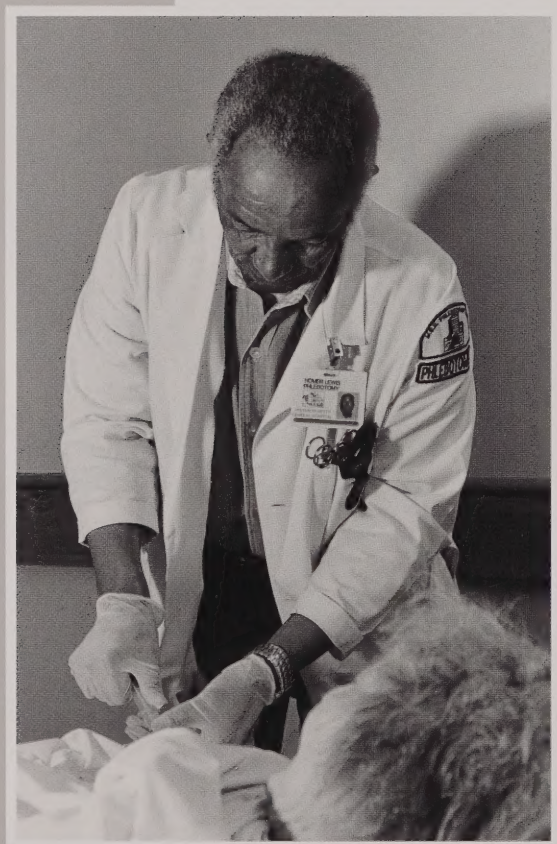
In the laboratory, Tayyaba Hasan, PhD, and scientists on her team have developed molecules designed to recognize and preferentially latch onto tumor cells. Attached to the carrier molecules are cancer-killing chemicals that become activated only in the presence of a specific wavelength of laser light. Exposing the tumor site to light releases chemicals that destroy the tumor cells, leaving unexposed healthy cells intact. "Even if this toxic chemical winds up in other parts of the body," says Dr. Hasan, "without the laser activation, the drug is generally harmless."

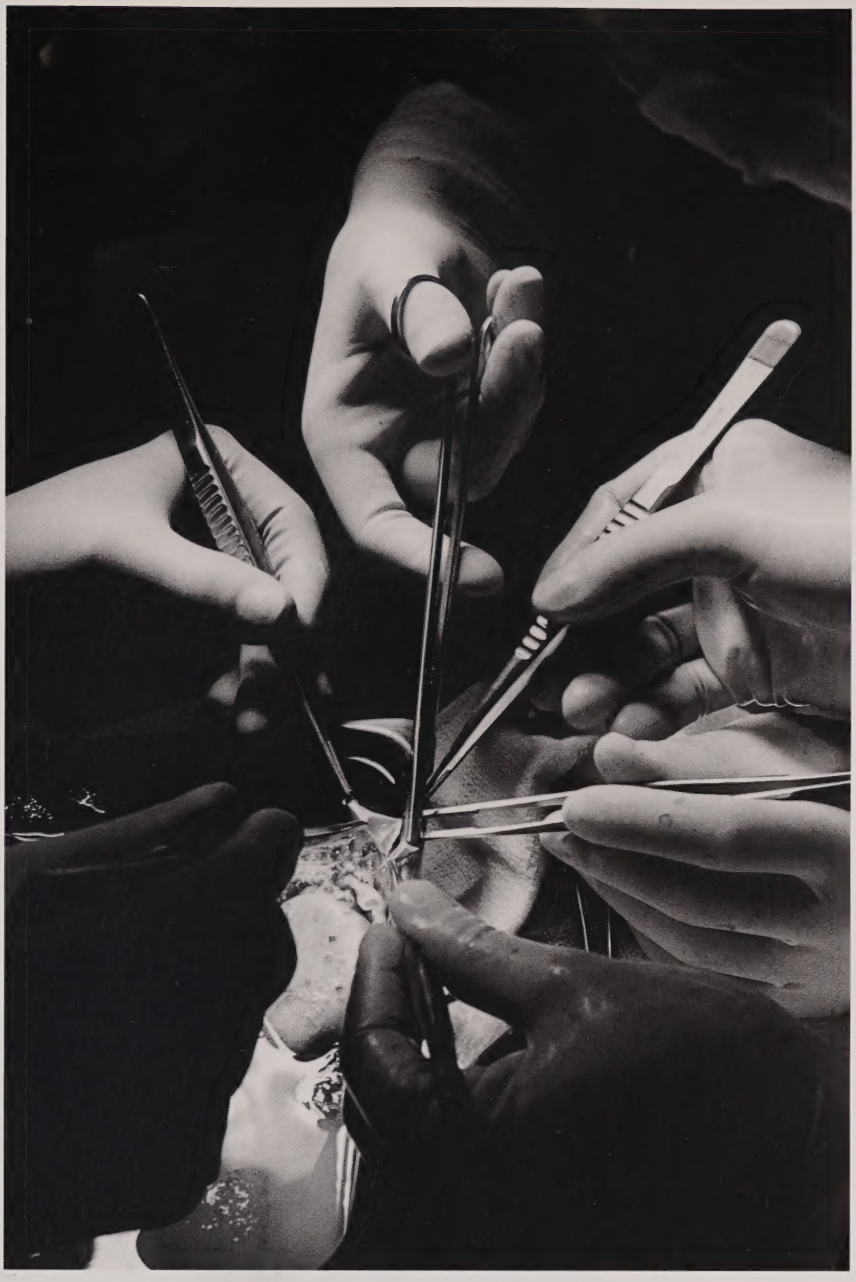
Used without drugs, lasers are offering new hope to the victims of cerebral vasospasm, a tragedy that usually strikes young adults. Currently, little can be done for this acute condition, which causes arteries to squeeze shut, gradually cutting off the blood supply to the brain. "Even if these young people survive, most of them are severely impaired," says Rox Anderson, MD, research director of the MGH Laser Center. In laboratory tests, Dr. Anderson has found that brief pulses of laser light delivered through a catheter inserted directly into the closed artery reverses cerebral vasospasm. The artery reopens and blood can flow freely once again.

Another type of laser, when coupled with a video camera and a computer, is not only powerful, but smart, too. Norman S. Nishioka, MD, clinical director of the MGH Laser Center, and his team have developed a laser-video-computer system that measures the precise depth of a burn injury, and then becomes a painless and bloodless surgical tool that removes the correct amount of damaged tissue in preparation for a skin graft.

THE YEAR IN REVIEW

Help for Clinical Depression Many people who are clinically depressed suffer from "anger attacks," inappropriate fits of rage. MGH researchers in the Psychopharmacology Unit have found that this problem can be treated with the antidepressant fluoxetine. **Heart Transplant Record** Three middle-aged men walked out of the MGH in April with the hearts of "young, athletic 20-year-olds" as a result of a record three heart transplant operations performed in one hospital in one day. All patients are in good condition. **Monitoring Vital Signs** The MGH announced in October an experimental electronic vital signs monitoring system that links small, portable monitors to centralized workstations. The system, designed to improve patient care, increase the efficiency of caregivers, and reduce costs, was developed by the MGH Anesthesia Department's Bioengineering Unit in collaboration with Protocol Systems, Inc., of Oregon. **MGH Obstetrics to Reopen** After a hiatus of more than 40 years, the MGH announced in December that the hospital would reopen its obstetrics service in late 1994 or early 1995. The new facility will be within the Vincent Memorial Hospital, the MGH gynecological service. **Safe Removal of Unsightly Blemishes** A laser treatment pioneered at MGH has received Federal approval for use in removing the unsightly skin blemishes called benign pigmented lesions, better known as freckles, liver spots, and birthmarks. **Guidelines on Pain** On March 4, in Washington, US Department of Health and Human Services Secretary Louis W. Sullivan, MD, announced a new set of guidelines on pain reduction. MGH physician Daniel B. Carr, MD, and Ada Jacox, RN, PhD, of The Johns Hopkins University School of Nursing were co-chairs of the 16-member panel that compiled the guidelines, which, if followed, could dramatically reduce pain experienced by patients. **Smoking or Health** The American Heart Association issued a position paper on June 10 recommending that tobacco smoke be treated as an environmental toxin and that ways be found to protect people from this health hazard. Two of the three authors are MGH physicians: Homayoun Kazemi, MD, chief of the MGH Pulmonary and Critical Care Unit and Douglas Johnson, MD, of the Pulmonary-Critical Care Unit and director of the Pulmonary Function Laboratory. **MGH Ranks Among Best** In June, *US News and World Report* chose the MGH as one of the three best hospitals in the United States in a national poll of more that 1,000 specialists. The poll gave the MGH top rankings in 11 specialties. **Seeing How the Brain Thinks** For the first time, scientists at the MGH Nuclear Magnetic Resonance Center in Charlestown have captured images that reveal and locate the physiologic changes that occur when the brain processes visual information. The technique for producing these images was developed at the MGH. **Center for Infertility**





Research The MGH received in October a $7 million, 5-year grant from the National Institutes of Health to establish a center for infertility research — one of only two such awards given across the nation. **The End of a 20-year Search** MGH investigators have found a new cause of human infertility: a mutation in a reproductive hormone gene. This was the first discovery to come out of the MGH's new National Center for Infertility Research, directed by William F. Crowley, MD. **New Imaging Research Center** The MGH opened the Center for Imaging and Pharmaceutical Research (CIPR) in May. CIPR was established with the assistance of a $21 million dollar grant by Sterling Winthrop, Inc. At the opening, researchers introduced the CT/Angio interventional unit, which could revolutionize the care of patients with cancer. The machine combines several imaging devices into one hybrid unit that will enable physicians to diagnose, stage, and treat cancer in one room at one time. Toshiba America Medical Systems worked with MGH doctors to design a prototype unit. **The Biology of the Skin** The MGH/Harvard Cutaneous Biology Research Center (CBRC) opened officially on October 3 with a ceremony featuring an address by US HHS Secretary Louis W. Sullivan, MD. The event was followed by an international symposium on the biology of the skin. **A New Understanding of Diabetes** Denise Faustman, MD, PhD, director of the MGH Immunobiology Laboratory, reported in December a new theory to better explain type I diabetes. Her work, if confirmed, may point the way to a more accurate and direct test to determine susceptibility to this form of the disease. **Independent Findings on Bone Disorders** A group of scientists at the MGH and another at both the MIT's Whitehead Institute and the MGH, working independently, announced in November the discovery of two important hormone receptors involved in bone disorders such as osteoporosis. The work could lead to more effective treatments for conditions characterized by bone loss. **Hope for Type II Diabetics** MGH and Harvard Medical School scientists reported in January that they have discovered a substance found naturally in the body that increases the production of insulin. The finding has important implications for the nation's estimated 10 million type II diabetics. **Genetic Link for Second Tumors** In May, an international group of researchers headed by Stephen Friend, MD, PhD, at the MGH Cancer Center, announced their discovery of a gene mutation that puts children who have survived certain types of cancers at high risk for developing second tumors. The researchers have developed a blood test for children with the mutation. **How the Body Fights Disease** A new finding by immunologists at the MGH Cancer Center was published in May suggesting that there may be a threshold of infection below which the body's disease fighting system fails to operate. This may explain why someone can be infected for years with a virus such as HIV-1, which causes AIDS, without having any symptoms.

Gene Implicated in Rare Disease MGH researchers, working with three groups of scientists in England, in June isolated and cloned a gene implicated in a severe genetic eye disorder — Norrie Disease. Although the disorder is rare, the findings will improve prenatal diagnosis and should deepen understanding about normal brain, eye, and ear development. **IHP Graduation** The MGH Institute of Health Professions (IHP) awarded 50 Master of Science degrees at its June graduation ceremony — two in dietetics, 12 in physical therapy, and 36 in nursing. The IHP is America's first graduate degree-granting institute directly affiliated with a hospital. **President Elected for ACOS** W. Gerald Austen, MD, MGH surgeon-in-chief, became the third MGH surgeon to be elected President of the 55,000 member American College of Surgeons. He assumed the post in October. **Institute of Medicine Elections** Two MGH doctors were among the 50 people recently elected to the prestigious Institute of Medicine of the National Academy of Sciences in Washington, DC. They were Morton N. Swartz, MD, chief of the James Jackson Firm Medical Services and Infectious Disease Unit, and Nicholas T. Zervas, MD, chief of the Neurosurgical Service. **New Chief of Pelvic Reconstructive Surgery** David H. Nichols, MD, joined the staff of the MGH Vincent Memorial Gynecology Service in July as chief of Pelvic Reconstructive Surgery. **Vincent Celebrates 100th Birthday** At a gala event at the Park Plaza Hotel, the Vincent Memorial Hospital (the hospital's gynecology service) and the Vincent Club, a volunteer organization of women that helps support the Vincent, celebrated their 100th anniversaries. **50 Years of Blood Transfusions** The MGH Blood Transfusion Service celebrated its 50th anniversary by kicking off a drive to increase employee blood donations. In fiscal year 1991, the hospital used about 57,000 units of blood, almost two thirds of which were collected through volunteer donations. **Make Way for the Ellison Building** The Baker Building, completed in 1930, was the first hospital building in the country built to meet the needs of the middle class. Demolition of the Baker Building was completed in December. **Timilty Students Sweep Science Fair** Of the 11 students who won prizes in the MGH-Timilty Science Fair, part of a collaborative partnership between the hospital and the Timilty Middle School in Roxbury, eight went on to win prizes at the Boston Public Schools Regional Science Fair. **Relocated Chapel Dedicated** The MGH Chapel celebrated its 50th anniversary on October 23 with a formal dedication of the Chapel in its new location on Ellison 1. **New Chairman of the Board** Ferdinand Colloredo-Mansfeld was elected as chairman of the Board of Trustees of both The General Hospital Corporation and of The Massachusetts General Hospital. Mr. Colloredo-Mansfeld, who has been a hospital trustee since 1972, succeeds W. Nicholas Thorndike, who became president of the hospital. In addition, three new trustees were elected — Mr. William S. Edgerly, Mr. Peter S. Lynch, and Dr. Linda S. Wilson. **Ether Day 1991** On October 18, the MGH recognized 1,420 employees who have provided between five and 50 years of service to the MGH. More than two thirds of the hospital's employees have worked here for 10 years or more. **MGH's First Woman Security Chief** Bonnie Michelman, CPP, CHPA, became the hospital's new director of Police and Security in October. **New VP for Development** Allen Peckham became vice president for development, responsible for managing the hospital's five-year, $160 million Leadership Campaign.

CHAIRMAN'S REPORT

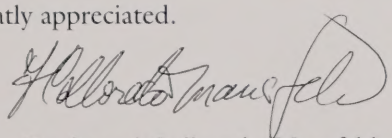
CONSIDERING the extraordinary impact that health care has on every citizen, it is no wonder that the nation has been riveted by the deliberations of President Clinton's task force on health care reform. For the past several months, the MGH trustees have also been listening to many voices across the nation, yet there appears to be little consensus on what policies should be pursued.

Whatever course is ultimately followed, those of us who govern the MGH must ready the hospital to respond to the challenges that the future holds. We know, at least, that the MGH must deliver excellent clinical care more efficiently, to more people, and at a lower cost — even as the patient population grows older.

A new health care system and the emergence of a mature managed care environment in Massachusetts will profoundly affect the hospital at every level — from how patient protocols are delivered at the bedside, to how the hospital organizes its housekeeping and support services. The hospital's facilities planning must reflect the expected decrease in hospitalized care and respond to the predicted expansion of ambulatory services. In teaching, a key part of the hospital's mission, the MGH must do more to educate its residents and fellows outside of the traditional inpatient setting, as more patients are treated on an outpatient basis. As federal funding for research becomes tighter, the MGH must continue to find cost effective ways to transfer the results of the laboratory to the bedside, a tradition for which this hospital is so widely respected.

Our goal is to ensure that the MGH maintains it excellence as the nation adapts to a new method of delivering health care to its citizens. Those associated with this great institution are intelligent, energetic, resourceful and committed to the hospital's mission. As they have so often in its 182-year history, the physicians, scientists, nurses, staff, and trustees of the MGH will rise to meet these new challenges.

Finally, I would like to thank my predecessor, Mr. Nicholas Thorndike. He has been a great help to me as I begin my chairmanship, lending his insights gained from 23 years as a trustee and, most recently, chairman of the hospital's board. His wise counsel is greatly appreciated.



Ferdinand Colloredo-Mansfeld

GENERAL DIRECTOR'S REPORT

IN THIS YEAR'S REPORT, the focus is on the role the Massachusetts General Hospital plays in defining how we ensure the future health of the residents of our local community — whether that be defined as the city of Boston, the metropolitan area, or the New England region.

Of course, providing excellent, science-based, compassionate patient care for all who seek our services is our first priority, and as time passes, we are doing more and more of that in the communities we serve — as a matter of convenience for our patients and as a way of containing health care costs. Research into better ways of diagnosing and treating illness and the evaluation of our care remains a major goal of ours, as does the education and training of health care professionals for service throughout this country and abroad.

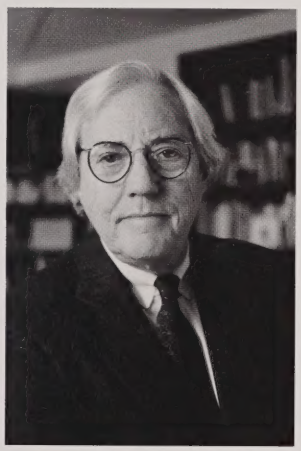
In helping to provide for the health of the region's population, the hospital also makes an important contribution to the health of the region's economy. We are the largest non-governmental employer in the city with some 14,000 employees, about a third of whom live in Boston proper. Approximately half of our $700 million 1992 expense budget went to salaries and wages, thus contributing significantly to the tax base of the city, the surrounding communities, and the state. And a very large proportion of our remaining operating expense budget goes to local vendors, consultants, and professional service organizations such as lawyers and investment managers.

Some have made much of the fact that the General and other Boston hospitals have spent hundreds of millions of dollars in recent years on the replacement of obsolescent plant and the acquisition of new technologies. I would point out that the principal short-term beneficiaries of these projects have been

the construction trades and the vendors of the necessary materials and supplies, most of whom are local businesses. Of course, the longer-term benefits of these projects will flow to our patients, their families and friends and our staff, the very persons for whom the projects were undertaken in the first place.

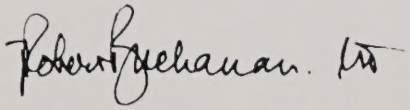
The hospital also makes significant payments to compensate the City for its use of services. In 1992, the General paid $750,000 in linkage fees as an expense for new construction and more than $1,274,000 in water and sewer charges. In addition, the hospital contributed over $750,000 to the City in lieu of taxes. Most important, in 1992 the hospital spent $42.9 millions on uncompensated care.

Throughout this report you will find still additional ways in which the hospital contributes to its communities. Some are obvious and directly related to its missions in patient care, biomedical research, and the preparation of health care personnel. Others bear no obvious connection to our role as a hospital *qua* hospital, but are simply manifestations of the institution as a good citizen.



As we anticipate reform of our national health care system, the General must become far more price competitive in order to continue its *principal* role as a provider of health services. In such an environment, the expense of professional education, the internal subsidy of biomedical research, and the provision of community services of a general nature all become extremely vulnerable as targets for cost cutting.

If the MGH and like institutions in Boston are to remain the resources of health care and social change they have traditionally been, the reform of the health care payment system will have to provide for their continuance in these roles or new agencies will have to be created to assume many of their present functions. Even so, there will be a continuing need for ever greater philanthropic support, for it is clear that the irreducible and true expense of our essential functions are not likely to be recognized. Otherwise society, especially its most vulnerable members, will be short changed in the name of reform and progress.



J. Robert Buchanan, M.D.
General Director

The Massachusetts General Hospital

as of December 31, 1992

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The General Hospital Corporation

Excerpts from audited financial statements (in thousands of dollars)

Revenue

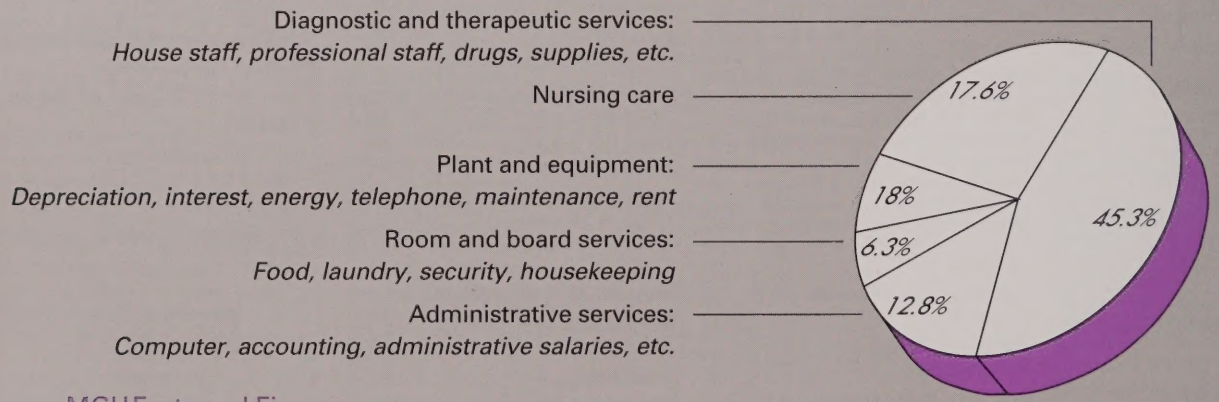
	1992	1991
Net patient service revenue	$498,458	$466,443
Other Operating Revenues		
Research and other specific purposes	164,347	137,712
Other	29,160	27,355
Total Operating Revenue	**$691,965**	**$631,511**

Expenditures

For operating expenses		
Salaries and related compensation	$332,055	$306,225
Supplies and other expenses	172,725	157,431
Depreciation	41,253	39,812
Interest	16,872	17,227
Provision for doubtful accounts	12,666	11,852
	575,571	532,547
Research and other specific expenses	111,304	94,548
Total Operating Expenditures	**$686,875**	**$627,095**
less total operating revenue	691,965	631,511
Surplus (Loss) from operations before adjustments	5,090	4,416
Adjustment for third party payors, estimated settlements, and effect of a change in accounting method	3,500	4,778
Surplus (Loss)	**$8,590**	**$9,194**

*Year ending September 30, 1992

The Hospital's Dollar



MGH Facts and Figures

Beds	1,044
Number of admissions	36,365
Number of ambulatory visits	558,411
Emergency department visits *(main campus)*	66,461
Emergency department visits *(Chelsea Health Center)*	16,824
Inpatient surgery	19,935
Day surgery	8,313

Medical staff *(clinical and research)*	2,143
Clinical fellows	320
Residents	500
Research fellows	625
Employees	10,170
RNs	1,375
LPNs	56
Nursing assistants	139
Volunteers	1,362

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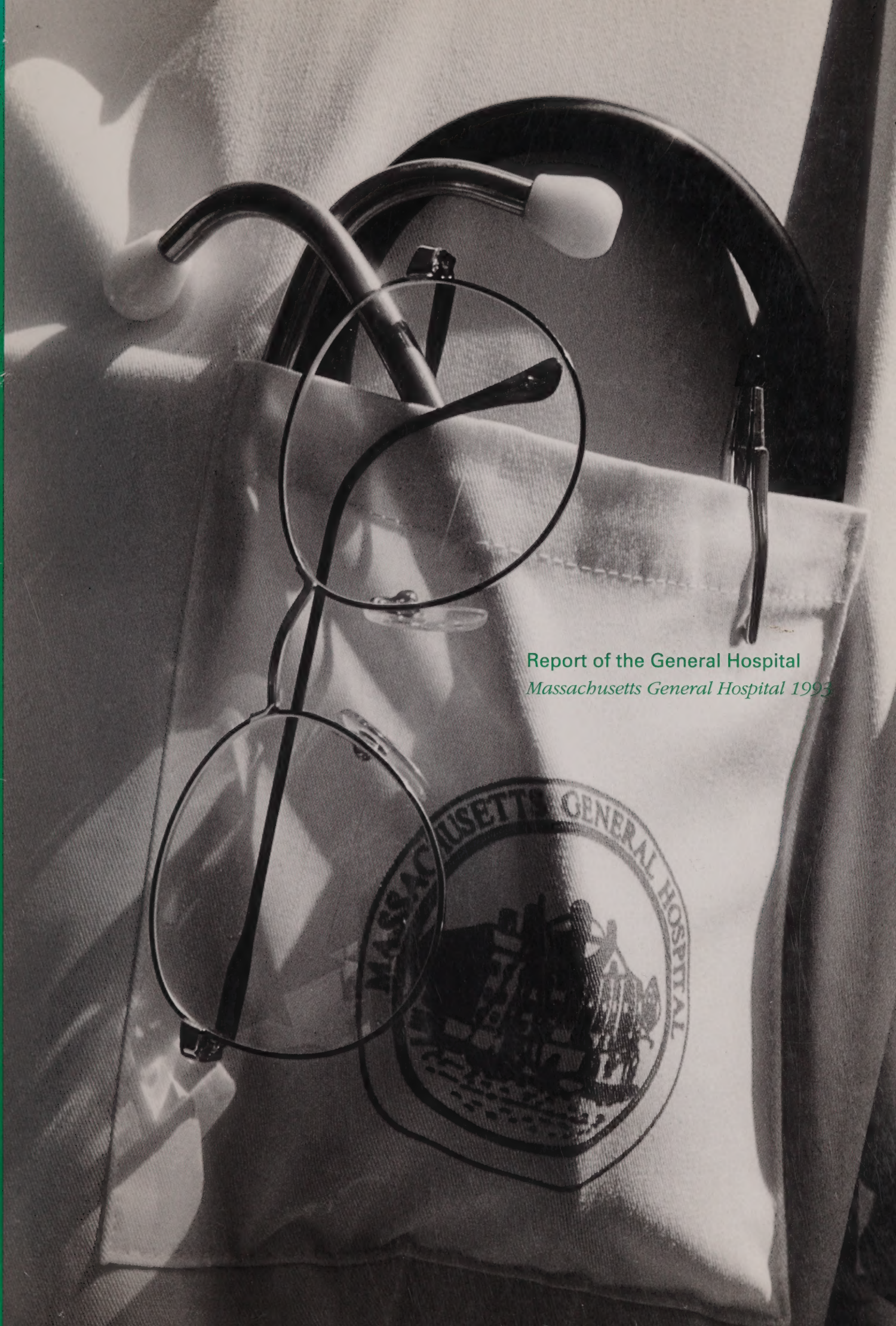

Report of the General Hospital

Massachusetts General Hospital 1993

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ntinued support.

achusetts General Hospital
11, the MGH has been a leader in health care.
nue to lead today, in part because more than 90 percent
ontribution we receive goes to helping us remain at the
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Leadership is easier to recognize than to define. To be the best, or to be the first — these are often signs of leadership. But there are less obvious qualities as well: a willingness to take risks; a vision of the future; an ability to influence others.

Since its founding in 1811 by two young physicians who wanted to better serve the poor, the Massachusetts General Hospital has been a leader in the field of medicine. Throughout its history, the MGH has achieved a number of firsts, including the first demonstration to the world of painless surgery using anesthesia in 1846, the first successful replantation of a severed human limb in 1962, and the development of artificial skin for burn treatment in 1981. The MGH is consistently ranked as one of the best hospitals in the United States.

Today the MGH is facing new and different challenges. The U.S. population is becoming increasingly diverse. It is projected that by the year 2050, more than half the population will be people now considered ethnic "minorities." That means doctors will see a different mix of patients with new types of illnesses, lifestyles, and values — all of which affect treatment choices. The cost of health care has also become a consideration. National health care reform, in whatever form it takes, means that doctors and nurses must learn to treat patients in a more cost-effective way.

To be a leader in this changing world, while remaining true to its core mission of patient care, teaching, and research, the MGH has begun to rethink the way it does much of its work. In the pages that follow are some of the people who have within them those intangible qualities of leadership so necessary to this process: a neurogeneticist willing to take a risk without being certain of the outcome; a nurse who saw a need and created a job to fill it; primary care providers whose vision for the future is rooted in the traditional values of medicine.

At the MGH, leadership begins with the individual.

The White Lobby
Marie Reardon, PT

'93

January 11

Neurologist Bradley Hyman, MD, PhD, receives a $100,000 Metropolitan Life Foundation Award for Medical Research — one of only three such grants in 1993. Dr. Hyman leads a team of researchers that is exploring dementia and memory impairment caused by Alzheimer's disease.

January 21

A memorial service is held for Ruth Sleeper, past Director of the MGH School of Nursing and Nursing Service who passed away in December, 1992. Her influence in reshaping the education and training of nurses lives on.

January 22

The hospital announces that Delta Air Lines has chosen the MGH as its preferred care cardiac center for all airline personnel in the northeast. The MGH is one of six hospitals nationwide so designated for Delta's 75,000 employees.

"In the future, boundaries will be less distinct between inpatient and outpatient care and between the MGH main campus and our community health centers. Our health care network will be able to serve patients wherever they need care."

Beth Beaumont, RNC, MS
Director of Nursing, MGH
Community Health Associates

When Gertrude Eisenberg woke up feeling nauseated last August, she thought she was having a diabetic reaction. But her blood sugar level was normal. Dismissing it as a mild case of the flu, she attended a family wedding as planned. But when she woke up the next morning and still didn't feel well, she decided to call Nancy Serrell, MD, her primary care physician at the MGH Chelsea Memorial Health Center.

"She saved my life," says Mrs. Eisenberg, a long-time Chelsea resident and grandmother of four. "When she heard what my symptoms were, she said to come in right away. The 'flu' turned out to be a heart attack."

In the current debate over health care reform, primary care physicians are sometimes referred to as gatekeepers. It is a poor choice of words: The implication is that they keep people out of hospitals. At the MGH, primary care providers function more as team quarterbacks. Whenever appropriate, they treat individual patients in their own communities. But when necessary, they connect those patients with state-of-the-art specialty care available at the hospital's Boston campus.

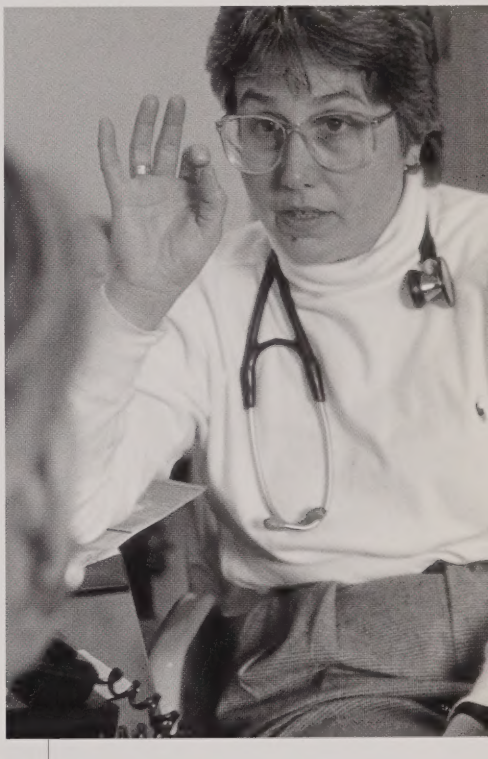
"With inpatient stays decreasing, and the emphasis on community-based care increasing, we will have to expand our network of care," says Brit Nicholson, MD, Assistant General Director for Primary Care at the MGH. "In the old days, we used to speak of going from the lab bench to the bedside. In the future, the goal will be to link the bench to the breakfast table."

That link is already in place at the MGH. "My husband drove me to the Chelsea Health Center, where I had an EKG," Mrs. Eisenberg recalls. "The next thing I knew, I was hooked up to everything but the kitchen sink, and I was riding in an ambulance on my way to the MGH."

Admitted to an intensive care unit until her condition stabilized, Mrs. Eisenberg later moved to a medical floor. After discharge, she spent 12 weeks in the Cardiac Rehabilitation Program, exercising on the treadmill and bicycles, and taking classes in cardiac and nutrition education and relaxation and stress management. Before it was over, she had lost 26 pounds and won an award for her efforts.

Ask Mrs. Eisenberg about her ordeal today, and she speaks warmly of the health care providers she encountered along the way — people like Kathleen McKool, RN, MS, and Kate Traynor, RN, MS, of the Cardiac Rehabilitation Program, who both called her at home to see how she was doing after she became ill while exercising one day.

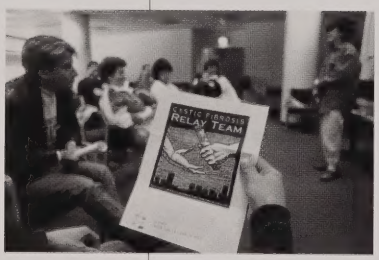
"It's not just a job with them, that's the way they make you feel," Mrs. Eisenberg says.



Gertrude Eisenberg
Nancy Serrell, MD

"To help people recover from complex conditions such as heart disease, you need a team of providers who can assist them in changing lifelong behaviors."

Andrew Littman, MD
Director of the Behavioral Medicine Division of the MGH Program in Preventive Cardiology



Neurogeneticist

James F. Gusella, PhD, may well be the first scientist to receive a standing ovation at a news conference for finding a gene — and it was all the sweeter because it came from some of his fiercest competitors.

Huntington's disease is a neurodegenerative illness that usually strikes in the prime of life and causes a progressive, debilitating mental and physical decline that invariably ends in death. Folk singer Woody Guthrie was its most famous victim.

Dr. Gusella's lab had uncovered the first clue about the gene's whereabouts in 1983, and most scientists assumed someone would find the gene itself in no time at all. But the gene eluded detection.

Meanwhile, the stakes had been raised with the formation of the Huntington's Disease Collaborative Research Group. Scientists from 10 institutions, including the MGH, agreed to share information and cooperate in the hunt.

It was a bit like playing poker and revealing your hand at the same time. "We all understood the need for cooperation," says Dr. Gusella, "but we also wanted our own labs to find the gene."

By 1991, the researchers who worked in the Molecular Neurogenetics Unit were growing weary. Faced with a genetic jungle at the tip of chromosome 4, Dr. Gusella and biologist Marcy MacDonald, PhD, decided to risk putting all of their resources into searching one small region that was predicted to be the most promising by an unproven method that they developed.

Their novel approach paid off. Drs. Gusella, MacDonald, and their colleagues discovered the Huntington's gene and its curious defect that can wreak havoc with brain cells. Officially, credit went to the Huntington's Disease Collaborative Research Group. But as the ovation showed, there was no doubt in anyone's mind about the team's most valuable player.

Running a marathon

may seem like an impossible dream. Imagine how much harder it would be if every breath were a challenge.

Yet a group of MGH patients with cystic fibrosis decided to run as a relay team in the Boston Marathon to prove to the world — and themselves — that they could do it. Twenty-three runners, ages 10 to 35, first ran in 1993; 18 ran in 1994. They raised public awareness of the disease as well as funds for research.

"Fifteen years ago, the thought of running at all would have been ridiculous for a person with cystic fibrosis," says Kon-Taik Khaw, MD, Associate Director of the Cystic Fibrosis Clinic at the MGH. "It's important for us to find new treatments for diseases, and it's also important to encourage patients when they want to attempt something, when they want to stretch beyond the limits an illness imposes."

Members of the cystic fibrosis relay team

James F. Gusella, PhD, and Marcy MacDonald, PhD

'93

February 11

An international team led by MGH anesthesiologist Warren Zapol, MD, reports in *The New England Journal of Medicine* that they had used tiny doses of a common pollutant, nitric oxide, to successfully treat patients with adult respiratory distress syndrome, a deadly type of pneumonia that results from an infection or a major trauma.

March 4

MGH researchers led by Robert H. Brown, Jr., MD, PhD, report in *Nature* that, as part of an international collaborative study, they have discovered the long-sought gene for amyotrophic lateral sclerosis (ALS), better known as "Lou Gehrig's" disease. The finding raises the possibility of developing a way to reverse or halt this deadly disease, which has so far eluded any attempt at treatment or cure.

March 12

MGH researchers report in *Cell* that they have identified the gene for neurofibromatosis type 2 (NF2). Although it is a rare disorder, the types of tumors NF2 produces are often found in the general population.

When Richard J. Kitz, MD, relinquished his responsibilities as Anesthetist-in-Chief at the MGH after 25 years, he left behind an enormous legacy.

During his tenure, Dr. Kitz introduced more sophisticated technology into the practice of anesthesiology and strengthened the use of pharmacology. He oversaw the growth of a department that is one of the best in the country.

But his broader contribution has been in cultivating the next generation of physicians — at the MGH and elsewhere.

MGH graduates now lead the anesthesia departments at Beth Israel Hospital, Children's Hospital, Dartmouth Hitchcock Medical Center, Duke University Medical Center, the University of California at Los Angeles, the University of Teikyo and Juntendo in Japan, and the University of Berlin in Germany, among others.

"I am interested in creating leaders," says Dr. Kitz. "There are three hallmarks of leadership that we've always looked for in this department. We've tried to recruit people who are overachievers, who have attempted something interesting and succeeded at it, and who are nice."

The first two qualities seem logical. "Leaders are not average people, and the quickest way to judge that is to look at the academic record," says Dr. Kitz. "We want to see if they have the capacity to influence others. What kind of activities did they engage in? And were they leaders or followers?"

But the last quality — niceness — may seem out of place.

"Certainly there are leaders who are not nice people," Dr. Kitz says, "but other people seeking advice and guidance gravitate more easily to a person who is. Being nice has a power that is often overlooked."

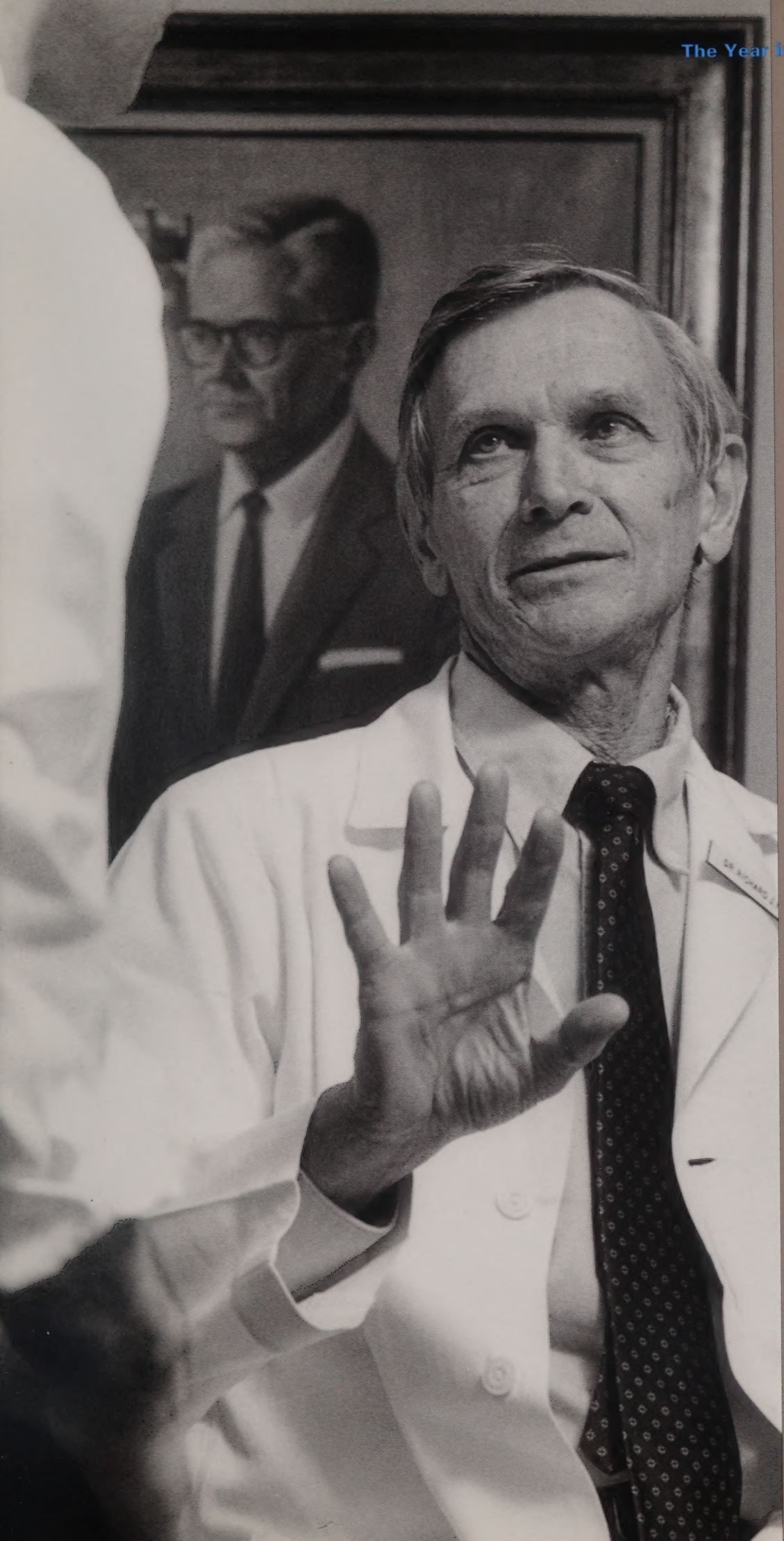
Dr. Kitz worked to create an atmosphere in which natural leaders thrive. "The object is not to put them in an environment that is too highly structured. Instead, we create high expectations, give them the resources they need, and then let them achieve."

"There are three hallmarks of leadership that we've always looked for in this department. We've tried to recruit people who are overachievers, who have attempted something interesting and succeeded at it, and who are nice."

Richard J. Kitz, MD
MGH Anesthetist-in-Chief

Richard J. Kitz, MD

'93



March 25

Before agreeing to undergo a hysterectomy for benign conditions, women should carefully consider less invasive alternatives, according to an article in *The New England Journal of Medicine* written by three MGH physicans. Isaac Schiff, MD, Chief of the Vincent Memorial Obstetrics/Gynecology Service; Karen J. Carlson, MD, a physician at the Vincent; and David H. Nichols, MD, Chief of Pelvic Reconstructive Surgery, are co-authors of the report.

March 26

MGH researchers led by M. Amin Arnaout, MD, report in *Cell* that they have identified a master switch that activates part of the body's immune system after a major trauma, such as a heart attack or a car accident. This discovery points to new and better treatments for the thousands of patients who die each year from traumatic shock in emergency rooms.

'93

March 26

The search for the gene that causes Huntington's disease ends where it began more than a decade ago, in the laboratory of James F. Gusella, PhD, Director of the MGH Molecular Neurogenetics Unit *(See story, Page 4).*

April 12

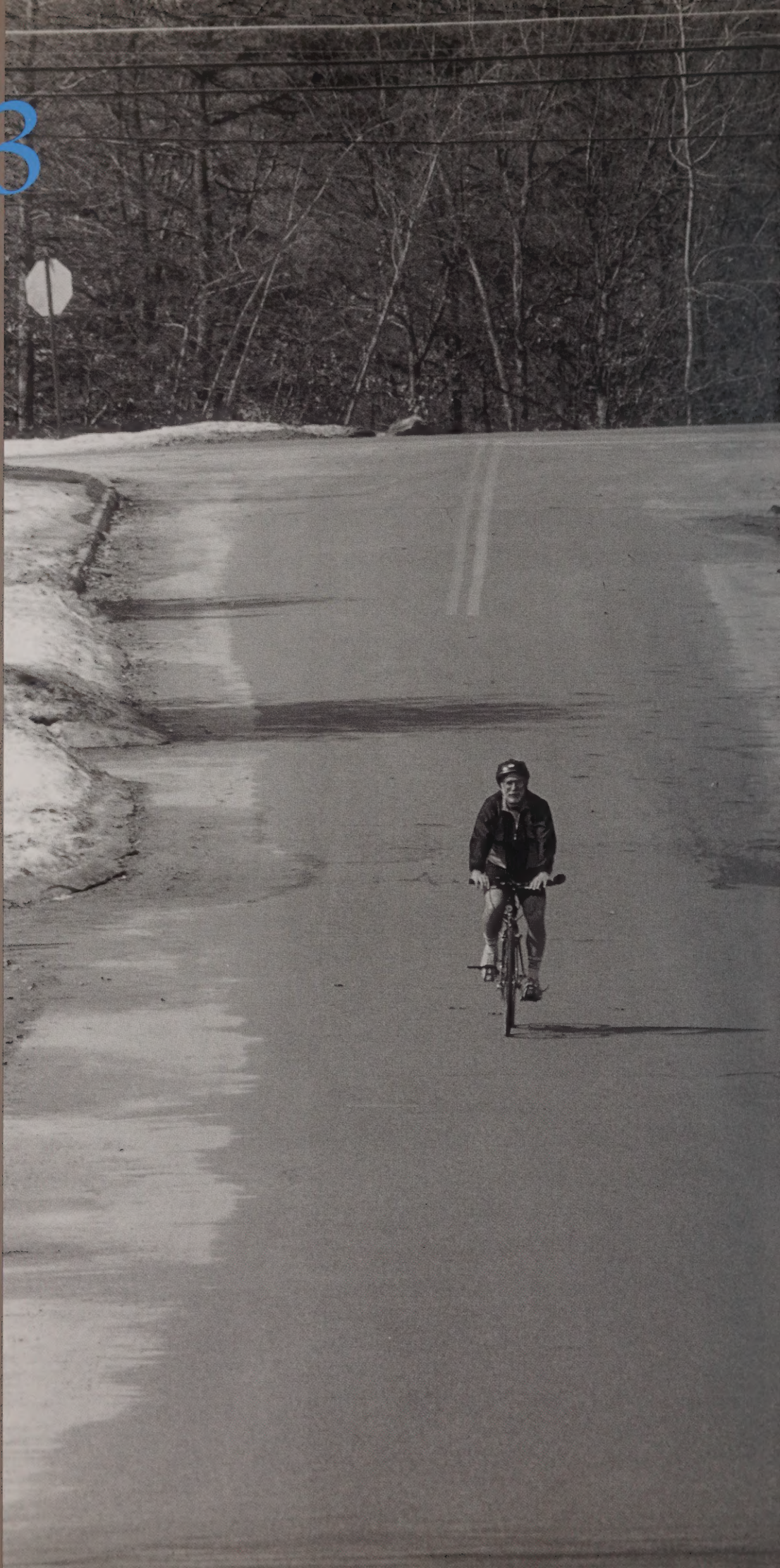
In Sup Choi, MD, Director of the MGH Interventional Neuroradiology Unit, demonstrates an unusual technique to treat inoperable brain aneurysms. Dr. Choi is one of only about 25 specialists in the world who are experienced in the procedure in which a tiny coil is threaded into the aneurysm, first filling and then obliterating it.

April 19

A relay team of MGH cystic fibrosis patients, doctors, nurses, and physical therapists run in the Boston Marathon. The runners hope to raise public awareness about cystic fibrosis and the importance of exercise as therapy.

April 26

Barbara Holland joins the MGH as its first Director of Diversity.



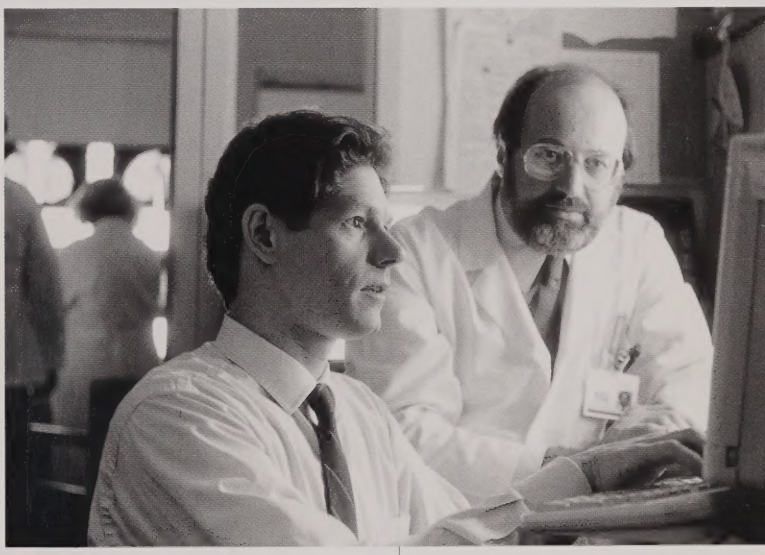
Elliot Schneider, of Sharon, Mass., was only 44 years old when he was diagnosed with invasive bladder cancer in 1988. A successful businessman and a dedicated athlete, Mr. Schneider refused to accept what was then the standard treatment: cystectomy, the complete removal of the bladder and some adjacent organs. That strategy might save his life, he reasoned, but it would have a devastating effect on his ability to enjoy it.

At the MGH, Mr. Schneider found a promising, but still experimental, alternative. A new treatment involving tumor removal followed by a combination of radiation and chemotherapy had been developed by Donald S. Kaufman, MD, a medical oncologist at the MGH Cancer Center, William Shipley, MD, a radiation oncologist, and urologists Niall M. Heney, MD, and Alex F. Althausen, MD.

Six years after undergoing the new therapy, Mr. Schneider is cancer-free and as active as ever. The MGH team reported in *The New England Journal of Medicine* that the pilot study had achieved a cure rate comparable to that of cystectomy.

"As physicians," says Dr. Kaufman, "we have to keep quality-of-life issues in mind as we prescribe treatments and develop new ones."

Daniel B. Kopans, MD, Director of Breast Imaging at the MGH, was frustrated. Radiologists who interpreted mammograms were relying on a typing pool to report their results. Transcriptionists typed from recordings, then sent a draft back to the radiologist for approval. At a rate of 80 to 100 mammograms per day, a backlog quickly developed.



Richard H. Moore, an engineer and computer scientist at the MGH, devised a solution: a software program that would enable radiologists using special codes to type their observations of mammograms directly into a computer, which then translates the information into a full report. The program reduces the time it takes to get results to patients and saves an estimated $40,000 a year in transcription costs alone. The American College of Radiology has used the approach and a similar coding system as a model for others now under development.

"This system helps to reduce patient stress by providing faster reports, and it will improve patient care by minimizing the chance of overlooking necessary follow-up," says Barbara Smith, MD, PhD, Director of the MGH Comprehensive Breast Health Center. "It is an excellent example of using technology in a way that helps patients."

Elliot Schneider

Richard H. Moore and Daniel B. Kopans, MD

'93

May 13

Researchers at the MGH and the University of Pennsylvania announce that they have found strong physical evidence for a mind/body connection in skin disorders. As reported in *Nature*, scientists led by MGH dermatologist Richard Granstein, MD, discovered that nerves in the skin's uppermost layer produce a substance that regulates the function of immune cells lying nearby.

June 13

A national research team reports that the risk of developing serious long-term complications from insulin-dependent diabetes, such as blindness, kidney damage, and amputations, can be significantly reduced by the stricter use of standard methods to control blood sugar levels. David M. Nathan, MD, Director of the Diabetes Research Center at the MGH, helped to lead the study.

"Improving the patient experience is important to us," says Jeff Davis, Assistant General Director for Continuous Improvement, "so we need to develop systems and give our employees the skills to provide good customer service."

This year, the hospital launched a pilot program in customer service training. The Department of Neurology and the MGH health centers participated in this initial stage. The Department of Neurology, for instance, has been examining everything from staff schedules to phone systems, seeking ways to increase efficiency.

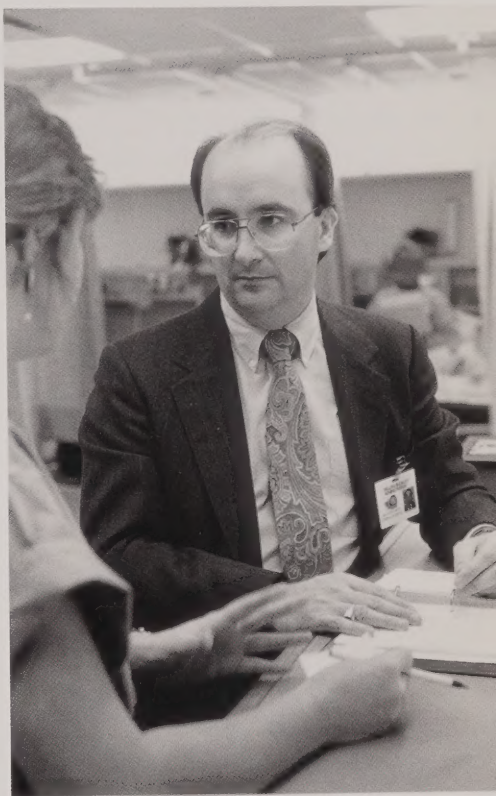
"We expect that our continuing efforts to improve operations and systems, coupled with customer service training, will make a huge difference in patient and employee satisfaction," says Sherri O'Grady, Administrative Director for the Neurology and Neurosurgery Services.

The customer service training program at the MGH has been designed and implemented by Ina Jubert, Program Manager; Suzanne O'Connor, RN, MS, CS, Content Consultant for the program; and the customer service training team.

"Patient-centered care throughout the hospital will be enhanced as we serve patients, families, and one another better," says Ms. O'Connor.

"Customer service can enhance not only the patient's experience, but also the employee relationship," says Ms. Jubert.

Responsiveness is the key issue. "It really gets back to the reason we're all here: to provide personal, quality care to everyone we interact with," says Ms. O'Connor. "Customer service is not something new; it's a reaffirmation of something old and valued."



Bill Buckley has been helping patients at the MGH since 1975, first as a social worker and later as Director of the Office of Patient Care Representatives.

"Most people think of this office as the hospital's complaint department," says Mr. Buckley, "but we view ourselves as problem solvers."

The approach Mr. Buckley uses is simple but effective. "Empathy followed by action: That's what patients really want when they're frustrated."

Mr. Buckley handles everything from complaints about parking to confusion about billing and concerns about treatment. There is often a common denominator. "The problems we see in this office usually boil down to miscommunication somewhere," he says.

As both employees and patients become more empowered, Mr. Buckley sees the role of his office evolving. "Everyone can be a problem solver," he says. "In the future, we will probably do less crisis management and more coaching of staff and patients about how to work together more effectively."

MaryKate Meunier, RN

Bill Buckley

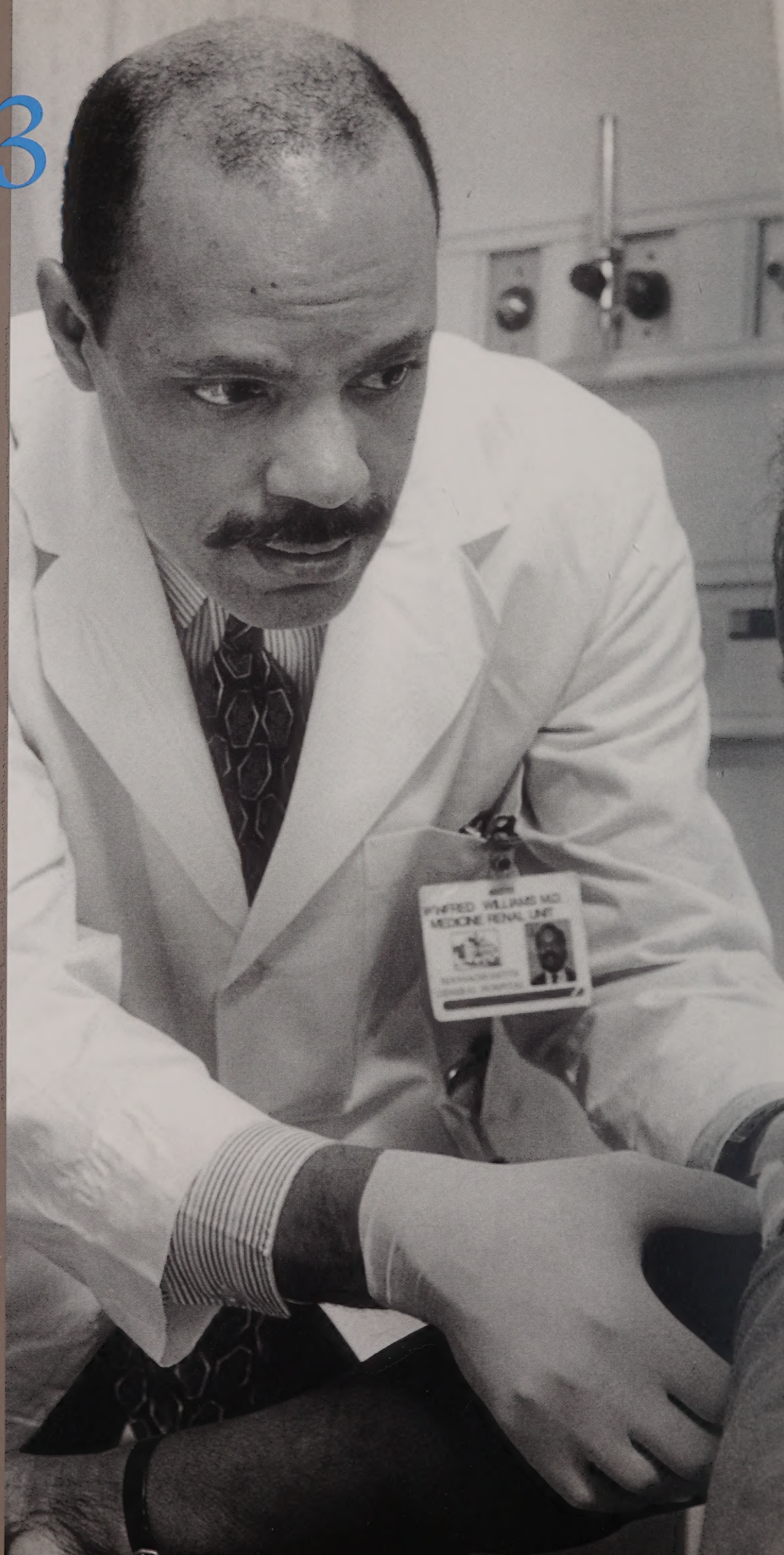
'93

June 29

The MGH announces that it will provide principal oversight for a new treatment plan aimed at improving the long-term survival rate of patients who have had a heart attack. The 4-year clinical trial, known as CARS (Coumadin® Aspirin Reinfarction Study) will be the most extensive clinical study to test the safety and effectiveness of a combination of the anticoagulant Coumadin (warfarin) and aspirin in the prevention of a second heart attack, cardiovascular death, and stroke in patients who have just had a heart attack.

July 29

The MGH Behavioral Medicine Unit announces that it is participating in a study to reevaluate the way CPR (cardiopulmonary resuscitation) is taught and find ways to improve its use. The MGH is one of only six hospitals nationwide chosen to participate in the study.



Bill McCarthy works in the MGH Mail Room. He made it to work every day this winter in spite of the heavy snowfall and sometimes impassable sidewalks. Because he has cerebral palsy, walking can be a challenge even when the sidewalks are clear.

But Mr. McCarthy asks for no special consideration. "I don't want my boss to change the rules just for me," he says. "All I want is a fair chance to show what I can do."

A fair chance is what strength in diversity is all about. People of color, people with disabilities — all are people first.

The MGH is committed to diversity not just because it is fair, but also to better meet the changing needs of a more diverse patient population. To help speed these efforts, the hospital this year hired its first Director of Diversity, Barbara Holland.

"We will be better at providing services when we include many different ideas, thoughts, and skills in the workforce," says Ms. Holland. "That means more than just hiring people from diverse backgrounds; it means putting them in positions of leadership where they can effect change."

In 1987, the Department of Medicine established the Minority Recruitment Committee (MRC) to promote the increased representation of minorities on its house staff. Now chaired by Winfred Williams, MD, Director of the Office of Minority Health Professions, the MRC offers research, training, and mentoring opportunities for people of color at all levels, from high school to postgraduate training, as well as career support for interns and residents.

The Minority Nurse Retention and Recruitment Committee (MNRRC) promotes the retention and recruitment of nursing professionals from culturally diverse backgrounds. The Alliance of MGH Minority Professionals supports diversity among nonphysician professionals at the hospital. And the Cultural Diversity Committee seeks to educate the hospital community about the backgrounds and customs of different ethnic groups.

Managers receive periodic updates and advice from the Employee Relations Office about such changes in the law as the Americans with Disabilities Act, which prohibits discrimination in the workplace.

Those on the front lines agree that there is a long way to go before the MGH reaches its diversity goals. And they are actively working to make it happen.

"The real issue here," says Ronald Greene, RN, co-chair of the MNRRC, "is commitment."

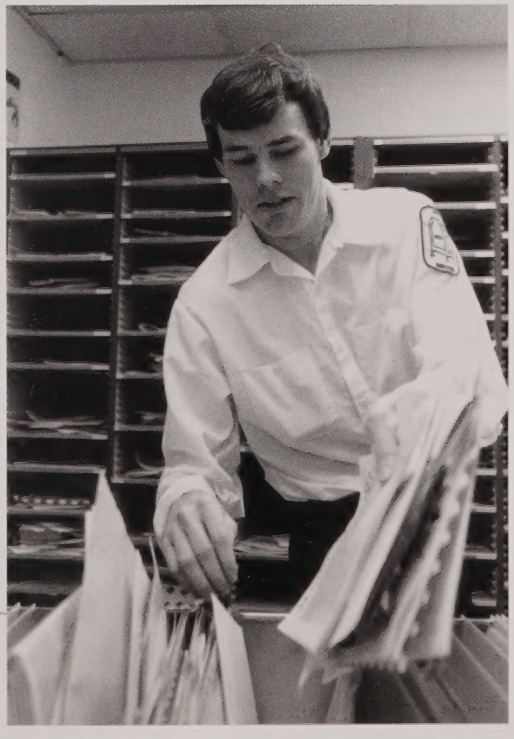
"What's important is that everyone understand that our diversity is a strength and not an additional responsibility that we're placing on people."

Barbara Holland
MGH Director of Diversity

"We need to nurture people of color who are already here, and encourage them to grow and take on leadership positions in the hospital."

Aletha Niles, RN, BS
chair of the MNRRC

Winfred Williams, MD



Bill McCarthy

When Jim Geanacou lost his laboratory job at the MGH last summer, he decided that he wanted to continue working at the hospital. Within weeks, he found another job at the MGH.

Mr. Geanacou is not alone. About half of the people laid off from the MGH thus far have found new jobs — many of them within the hospital.

Downsizing is one of the most painful consequences of the changes now under way in health care.

"To improve our efficiency without reducing the quality of patient care, we have to restructure, and that includes reductions in force," says George Sweeney, Manager of Recruitment at the MGH. "But at the same time, we feel a moral obligation to assist employees whose positions have been eliminated."

Mr. Sweeney also directs the Transition Center, located in the Human Resources Department. The center offers job placement services to MGH employees who have been laid off — including use of a computer and printer, free mailing services, and unrestricted telephone access. Human Resources recruiters provide coaching for interviews and leads on jobs.

Mr. Geanacou was assisted by recruiter Gayle O'Book. "Gayle was a tremendous help," says Mr. Geanacou. "She was diligent, professional, and competent."

And now he can be philosophical: "As it turned out," Mr. Geanacou says, "I have gained experience in two departments at a great hospital."

Employees who retain their jobs are also facing difficult challenges: added responsibilities, changing schedules, uncertainty about the future. Both the Employee Assistance Program (EAP) and the Employee Relations Office have taken the intitiative to help managers and employees cope with change.

"We understand that uncertainty creates anxiety," says Andrea Piraino Stidsen, Director of the EAP. "But there are ways to handle this stress in a positive way." The EAP has organized stress management seminars for both managers and employees. It also provides one-on-one counseling and referrals.

Beverly Lasovick, Manager of Employee Relations, has also seen an increase in anxiety. "Employees have been asked to become more like entrepreneurs," she says. "Nothing is guaranteed any more. To do well, our employees will need to learn new skills."

But change can also be an opportunity. "Our mission in this office is to empower each individual to reach his or her optimum capabilities," says Ms. Lasovick. "That will contribute toward organizational excellence. Rather than having adversaries in the hospital, we create a common purpose."

Beverly Lasovick (top) and an EAP seminar

Jim Geanacou

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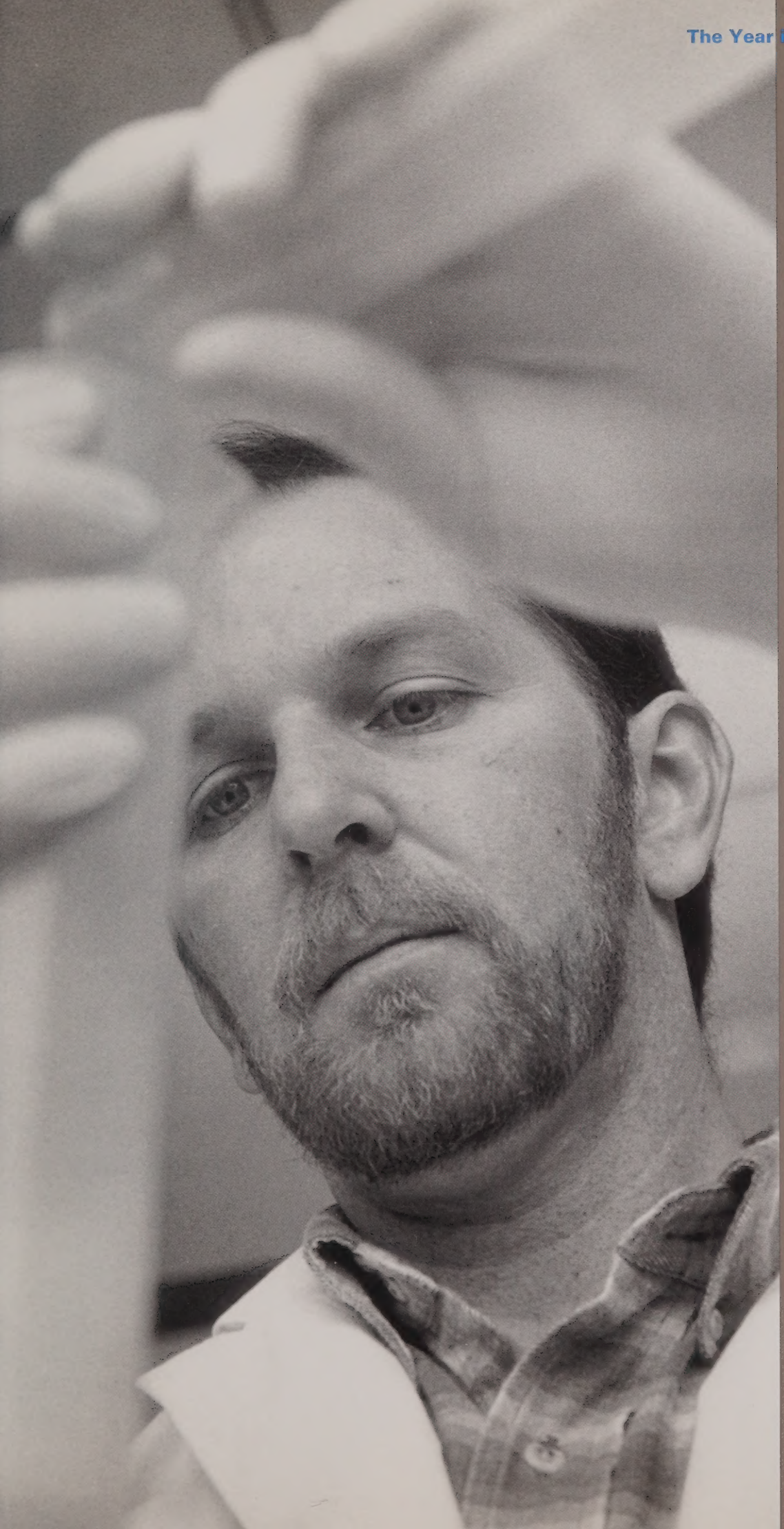


August 13

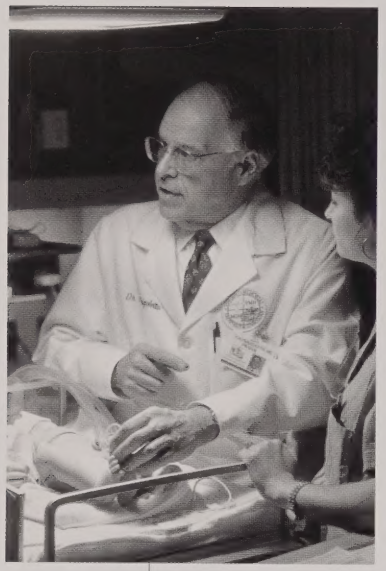
Researchers at the MGH and Duke University Medical Center report in *Science* that they have found that people who inherit two copies of a particular form of a certain gene are eight times as likely to suffer from Alzheimer's disease. Neurogeneticist Jonathan Haines, PhD, leads the MGH team and is co-principal investigator of a federally funded study to identify the genes involved in Alzheimer's.

August 19

The MGH undergoes a surprise dress rehearsal for the opening of its obstetrical service with the unexpected early arrival of Matthew Ryan Kelly, whose mother was in Cambridge on a business trip and thought she was having some indigestion.

September 1

MGH physician Garner T. Haupert, Jr., leads a team that extracted and determined the chemical structure of a long-sought brain chemical suspected of causing many cases of high blood pressure. This is a first step toward synthesizing and manufacturing a compound that could be used to improve treatment.



Frederic D. Frigoletto Jr., MD (top) and Karen Carlson, MD

An obstetrical service will open at the MGH in 1994 after a 40-year hiatus. The decision reflects the hospital's commitment to strengthening its primary care services and to provide integrated, family-centered care.

"Our patients have been frustrated at not being able to deliver babies here," says Isaac Schiff, MD, Chief of the Vincent Memorial Obstetrics/Gynecology Service. "Offering obstetrical services will enable us to provide continuity of care."

Another factor in the decision to open an obstetrical service involves the shift toward managed care in Massachusetts, and insurers' preferences for negotiating contracts with full-service hospitals. Frederic D. Frigoletto Jr., MD, Chief of Obstetrics, points out that "when women have their babies at a hospital, they often return there for their child's care and for other services their families may need."

Outpatient and inpatient obstetrical services will be located in the Blake Building. Care will be provided by a team consisting of both obstetricians and midwives. The patient will be able to choose the kind of care she prefers.

"While we will be able to provide the sophisticated care needed by high-risk patients, the majority of our patients will anticipate normal pregnancies," says Dr. Frigoletto. "The MGH intends to deliver the highest quality of care, with the best possible outcomes, at the lowest reasonable cost."

Women's Health Associates, a primary care group practice at the MGH, will share a floor with the new obstetrical service.

Both patient education and preventive care are emphasized at Women's Health Associates. Its physicians empower patients by providing educational handouts on how to better communicate with doctors, as well as information about a range of illnesses.

"We want to encourage active engagement in our patients, rather than passivity," says Karen Carlson, MD. "It's healthier all around."

Dr. Carlson has studied the differences between male and female patients. "Women tend to ask more questions, are more informed, and tend to exchange more information than men," Dr. Carlson says. "That's actually the kind of behavior we want to encourage in all patients in the future. It makes for a better health outcome."

'93

September 2

The MGH participates in a study published in *The New England Journal of Medicine*, which concludes that early, aggressive treatment with t-PA, an agent that dissolves blood clots, will increase a person's chances of surviving a heart attack.

September 8

MGH surgeons report that they have successfully performed New England's first heart/liver transplantation. Gus Vlahakes, MD, Surgical Director of the Cardiac Transplantation Program, and Joren Madsen, MD, DPhil, performed the heart transplant surgery first, then A. Benedict Cosimi, MD, Chief of the MGH Transplantation Unit, and John A. Powelson, MD, performed the liver transplant operation.

September 9

MGH researchers announce the start of a two-phase study on the quality-of-life impact of chronic Gaucher disease and a new enzyme-replacement treatment. This inherited disorder most often afflicts Ashkanazi Jews (those descended from Europeans), and is as common as sickle cell anemia in the African-American population and hemophilia in the general population.

'93

September 15

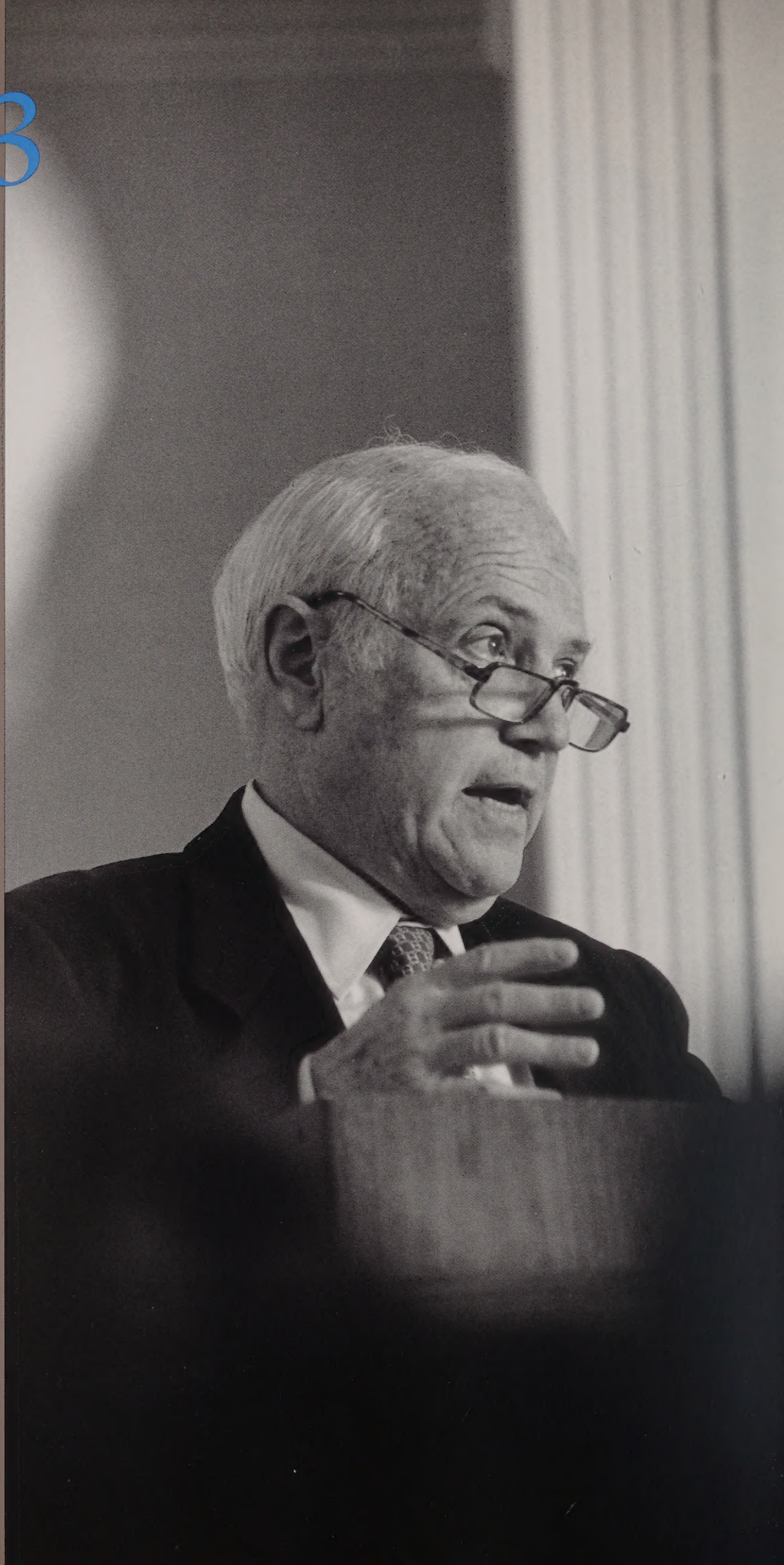
Sandia National Laboratories and the MGH Wellman Laboratories of Photomedicine announce that they will develop a laser- and sensor-based system for treating patients with severe burns. This would be an improvement over traditional surgical removal of burned skin.

September 17

Daniel B. Kopans, MD, Director of Breast Imaging at the MGH, co-authors a paper that criticizes the National Breast Screening Study of Canada, which concluded that using mammography for breast-cancer screening in women ages 40 to 49 was not effective. Dr. Kopans argues that the Canadian study involved too few women and was significantly flawed, and urges women to get regular mammograms.

October 13

Dr. Harriet Louise Hardy, a pioneer in the field of occupational medicine, dies after a long illness. Dr. Hardy established the MGH Occupational Medicine Clinic in 1947 and was its director until her retirement in 1971. During her career, she became an international crusader against the "man-made" diseases caused by occupational exposure to dangerous substances such as beryllium.



As Surgeon-in-Chief at the MGH for the past 25 years, W. Gerald Austen, MD, has encouraged the growth of a department that is among the world's best in surgical care, education, and research. And as a participant in early negotiations that led to the affiliation with Brigham and Women's Hospital, he helped lay the foundation for an integrated health care system that will offer the best medical care available anywhere.

Perhaps that is not surprising for someone who initially trained as an engineer at MIT before going on to medical school. Throughout his career, Dr. Austen has combined the compassion of a physician, the problem-solving skills of an engineer, and a visionary's sense of the future.

When Dr. Austen first assumed leadership of surgical services at the MGH in 1969, he foresaw the need for greater specialization as hospitals began to care for older and sicker patients. Perhaps one of Dr. Austen's greatest accomplishments is the fact that in spite of his own interest and achievements in cardiac surgery, he has seen to it that the Department of Surgery at the MGH continues to be equally outstanding in the other areas of surgery and has steadfastly championed the broad, balanced training of surgeons.

Throughout Dr. Austen's long career, he has made many important contributions to new knowledge that have improved the care of cardiac surgical patients. He has been one of the world leaders in studying the physiological events that occur during heart surgery, particularly during open heart surgery, and in using the new knowledge to make heart surgery safer.

In the past few years, cost and reimbursement pressures have increasingly entered the world of medicine, even the operating room, creating a need for a new vision.

"There is a tremendous change in the way that health care is being delivered in this country," says Dr. Austen. "It's clear that we need to begin building a health care network that includes community hospitals and primary care providers as well as specialists."

"It's crucial that we don't stop here, that we keep developing our network of patient care facilities. MGH physicians must lead the way in cooperative efforts with their Brigham counterparts."

W. Gerald Austen, MD
MGH Surgeon-in-Chief

W. Gerald Austen, MD

"The role of nurses has evolved more than many people realize. Many have advanced degrees and years of patient care experience in multiple settings. They are dedicated to developing a better system of care as well as working with individual patients and families to maintain or improve health."

Mary Connaughton, RN, MS
Director of Medical and Emergency Nursing at the MGH

"As physicians, we are usually trained to focus on a particular medical problem. Nurses bring a different perspective, a concern with the interaction among a patient's personality, illness and environment. This is especially important when the social context has such a powerful role in a patient's life."

Michael Bierer, MD
Director of the MGH Medical Program for the Homeless

The elderly woman was used to the impersonal life of the streets. So she was surprised when the nurses on White 9 pulled out all the stops to celebrate her birthday with streamers, gifts, and a cake.

A small act of kindness, but significant. It enabled the nurses to gain the woman's trust and build a relationship with her that would continue even after she returned to the community.

That is precisely the kind of interaction that Kathleen Cumming, RN, MS, a clinical nurse specialist who works with the MGH Medical Program for the Homeless, wants to encourage.

"People who are homeless may lack a permanent address or a phone number," Ms. Cumming says. "To ensure adequate follow-up care, you have to have resources right at your fingertips at the time of discharge."

Over the past few years, Ms. Cumming has worked to pull those resources together. As a staff nurse on White 9 and a graduate student at the MGH Institute of Health Professions, she conducted a hospitalwide needs assessment regarding the care of homeless patients.

Several years ago, she introduced herself to Michael Bierer, MD, Director of the MGH Medical Program for the Homeless, who had just begun doing inpatient rounds of homeless patients.

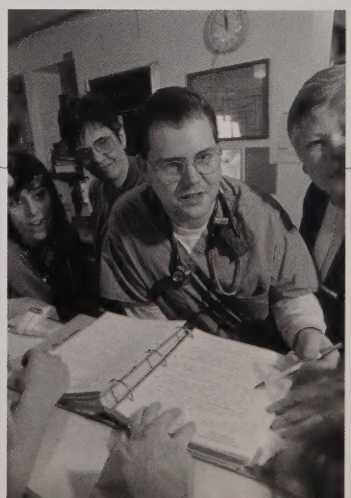
"I was impressed by the progress he was making," Ms. Cumming says, "but I told him half his team hadn't shown up yet."

The missing component was nursing — but that didn't last long.

Today, Ms. Cumming and other members of the homeless team determine the individual needs of each patient, communicate with area homeless shelters, coordinate care at the MGH, and work together to create a discharge plan.

The MGH Medical Program for the Homeless, part of the citywide Boston Health Care for the Homeless Program, has long been an example of providers from different institutions cooperating to improve health care for vulnerable people. But it is also a model of collaboration among providers within the MGH — physicians, nurses, and social workers.

There may be a lesson here for all providers, no matter what backgrounds their patients have. "Working with a homeless person requires flexibility, not rigidity," Ms. Cumming says. "You need to look beyond the scope of your own practice and go the extra mile."



Left to right: Mary Connaughton, RN, MS; the nursing team on Bigelow 9; Kathleen Cumming, RN, MS.

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October 22

MGH researchers led by neurologist Bradley T. Hyman, MD, PhD, report in *Neuron* that a molecule known as LRP, which helps to clear cholesterol from the bloodstream, may also play a crucial role in clearing amyloid deposits from the brain. The finding is significant, because patients with Alzheimer's disease tend to have excessive amyloid deposits, although what role they play in the disease remains unclear.

November 1

Phyllis L. Carr, MD, a physician with MGH Women's Health Associates, leads a study that finds that women physicians in internal medicine at teaching hospitals are not promoted as often and earn about 10 percent less than their male colleagues.

November 3

Take two strips of bacon and call me in the morning? It sounds strange, but MGH researchers led by Timothy F. Brewer, MD, MPH, of the Infectious Diseases Unit, report in *The Journal of the American Medical Association* that bacon can be part of a cure for furuncular myiasis (a skin infestation caused by fly larvae or maggots).

'93

November 4

MGH physicians report in *The New England Journal of Medicine* that they have found, in a pilot study, a way to treat invasive bladder cancer that is just as effective as conventional therapy but has the advantage of preserving the patient's bladder function.

November 16

The North Shore Medical Center and the MGH announce that they will develop a system affiliation. This is a vital step in the development of an integrated health care network.

November 19

Researchers in the MGH Cardiovascular Research Center report in *Cell* that they have identified, for the first time, a gene involved in programmed cell death in mammals and discovered a way to stop the process once it had begun. Programmed cell death is a natural process vital to development. The finding has broad implications for a wide range of diseases, including Alzheimer's, Huntington's, some cancers, inflammation, rheumatoid arthritis, stroke, and traumatic brain injury.

Anticipating a return to community-based medicine and the increased importance of primary care, the MGH this year began strengthening its relationships with primary care providers throughout the state and to strengthen its own training of young primary care providers.

In November, the MGH expanded its affiliation with the North Shore Medical Center and its physicians in Salem. It also announced its intent to form a new health care organization to integrate and support primary care physicians in the delivery of comprehensive, capitated services. Cape Ann Medical Center, a group of 11 internists in Gloucester, was one of the first primary care groups to work with the MGH in the development of this organization. And in December, the MGH and more than 40 primary care physicians who are members of the Massachusetts Associated Physicians, Inc., based in Framingham and Natick, announced their intention to jointly develop a primary care group practice.

"When we talk about primary care, we really are going back to the future. That is how medical care was once delivered."

Mark Eisenberg, MD
primary care physician at Bunker Hill Community Health Center

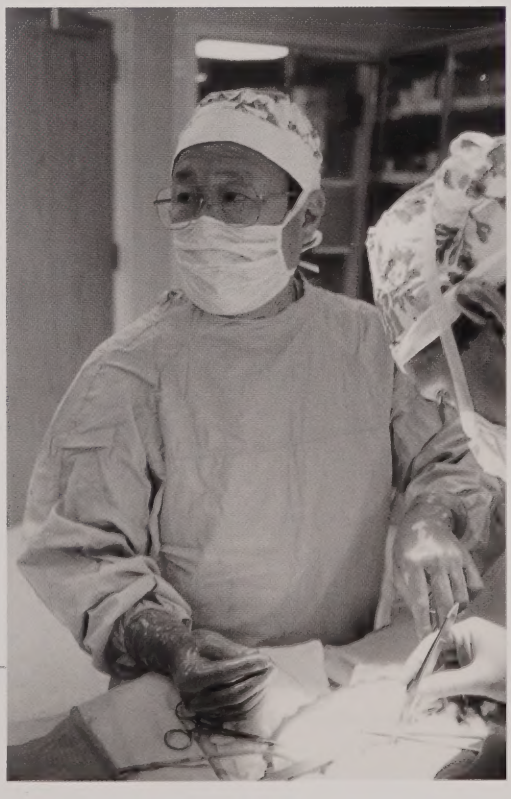
Physicians at the Massachusetts General Physicians Corporation (MGPC) have worked closely with Richard von Rueden, MD, Deputy to the General Director, in forging these new agreements. "We wanted to take a leadership role in negotiations with community health care providers to deal with managed care," says MGPC President Samuel Kim, MD.

Meanwhile, the number of residents in the primary care training program at the MGH has grown steadily over the past few years and will continue to do so. In response to the emphasis on outpatient services, all residents will also receive longer and more vigorous training in ambulatory care.

"In an inpatient setting, you have ready access to subspecialists for consultations and to social workers, therapists, and nurses for support," says Brit Nicholson, MD, Assistant General Director for Primary Care. "It's also a very controlled environment, from the doctor's perspective. That degree of control is lost in the outpatient setting. Support services and other resources are dispersed. To be effective, physicians must become skilled communicators and coordinators as well as clinicians."

Given the rapid demand for primary care services, other types of providers will also become increasingly involved in patient care. Advanced practice nurses, for instance, are expected to play a bigger role in patient education, disease prevention, and the diagnosis and treatment of illness.

A key to the evolution of medicine at the MGH will be individuals, such as those who are profiled in this report, who respond positively to changing needs.



Cape Ann Medical Center patient, Donald R. Riley

Samuel Kim, MD

When Samuel O. Thier, MD, becomes President of The Massachusetts General Hospital, he will be returning to the institution where he began his medical career. And his familiarity with the core values that have shaped the MGH will be invaluable as he guides the institution during an era of unprecedented change in health care.

Dr. Thier received his internship and residency training at the MGH. He later became Chief Medical Resident and Chief of the MGH Renal Unit before leaving Boston in 1969. Upon his return to the area in 1991, he rejoined the MGH medical staff, participating in medical grand rounds and teaching rounds.

As President of The Massachusetts General Hospital, Dr. Thier will direct a parent corporation that now oversees seven affiliates, including the General Hospital ("MGH"), McLean Hospital, Spaulding Rehabilitation Hospital, the MGH Institute of Health Professions, the MGH Home Health Services Corporation, and the MGH Professional Services Corporation.

"If first-rate institutions like ours are not going to play a key role in redefining health care, then who will?"

Samuel O. Thier, MD

"We need to be sure we have a clear overall mission and a clear process for getting all the affiliates to work together," Dr. Thier says. One of his top goals will be to strengthen the institution's commitment to community service.

Dr. Thier has also been named President of Partners HealthCare System, Inc., the parent organization that unites the MGH and Brigham and Women's Hospital (BWH). Dr. Thier will work with H. Richard Nesson, MD, President and Chief Executive Officer of BWH, to oversee a newly created executive office that will integrate the two hospitals, define and develop an expanded health care network, and make the system cost-effective.

"If first-rate institutions like ours are not going to play a key role in redefining health care, then who will?" Dr. Thier asks.

Dr. Thier has developed a reputation for taking on big challenges. As Chairman of the Department of Medicine at Yale School of Medicine, he re-energized a department that had been without a leader for months and was in serious disarray. Dr. Thier is also credited with reinvigorating the Institute of Medicine of the National Academy of Sciences.

Most recently, as President of Brandeis University, Dr. Thier was praised for accomplishing difficult changes with a remarkable degree of cooperation. He implemented a new curriculum that is considered a national model and put the university on a fast track to financial stability.

Now, as he looks forward to the biggest undertaking in his career, Dr. Thier recalls a sign at Yale that read: "There is no greater burden than a great potential."

"This is a defining moment for health care," says Dr. Thier, "and I am eager to accept the challenge of managing a medical center with such a rich history of leadership."

Samuel O. Thier, MD

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November 29

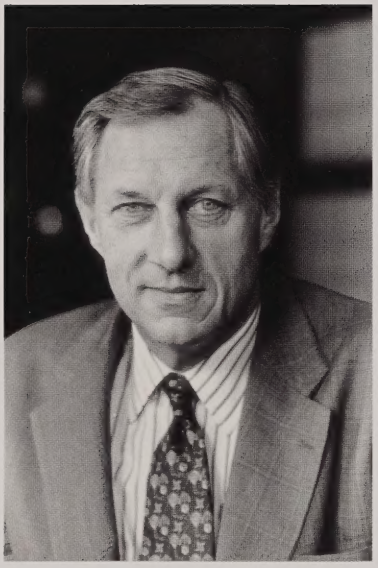
The Cape Ann Medical Center in Gloucester and the MGH announce that they will establish a new health provider partnership. Cape Ann Medical Center is an independent group of 11 internists who have provided adult and adolescent primary care to the residents of Cape Ann for the past 30 years.

December 1

Researchers at the MGH and Columbia University report in *Nature-Genetics* that they have identified the gene for Wilson's disease, in which excess copper accumulates in the liver and is slowly released into other parts of the body. Because Wilson's eventually causes brain damage and dementia, the finding adds new genetic support to the theory that metal toxicity may play a role in neurodegenerative diseases.

December 29

The MGH and more than 40 physicians at the Massachusetts Associated Physicians, Inc. (MAPI), based in Framingham and Natick, announce that they intend to jointly develop a primary care group practice. This is believed to be the largest group of independent practitioners who have come together to form a primary care organization as part of a health care delivery system.



This year, at the Massachusetts General Hospital, we are preparing to close an important and dynamic era of accomplishment. On behalf of the entire MGH community, I extend my heartfelt thanks to Dr. J. Robert Buchanan, who will step down after 12 years as General Director at the end of June 1994. Bob's wisdom and his ability to take decisive steps forward have allowed the MGH to sustain its preeminence in academic medicine throughout an era of regulatory change and intense pressures, both internal and external.

We thank and congratulate Bob on a tenure marked by numerous accomplishments, including the completion of a successful $175.6 million capital campaign and the launching of another $160 million fund-raising program.

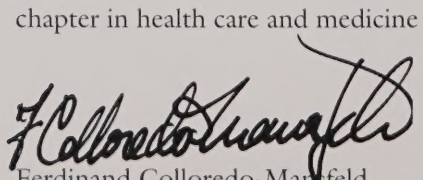
Perhaps Bob's most visible contribution can be seen in the physical campus he has so diligently reshaped and modernized. The Ellison Building and the soon-to-be-opened Blake Building are the most recent results of his emphasis on providing comfortable, welcoming, and efficient facilities for our patients. Bob's vision also led to the development of our magnificent research facility at the Charlestown Navy Yard.

Under Bob's leadership and concern for long-term interests of the MGH, the hospital took a giant stride in December 1993, as it announced the affiliation with Brigham and Women's Hospital, creating Partners HealthCare System, Inc. In recent months, representatives from both institutions have begun to develop detailed plans of how the system's new network will take shape. The process is not simple, but the goal is critical: to create a health care delivery system that will be a model of top-quality, cost-effective care coupled with the best in teaching and research.

We are especially pleased that Bob's insight and experience will continue to be available to the MGH, as he will be working on special fund-raising and international projects.

I also want to welcome Dr. Samuel O. Thier, who in May will assume the positions of President of The Massachusetts General Hospital and President of Partners HealthCare System, Inc. Sam, who has been President of Brandeis University, began his career at the MGH. As President of the prestigious Institute of Medicine of the National Academy of Sciences, he grappled with some of the most pressing issues associated with medicine today. We are delighted with Sam's return to the MGH and look forward to working together.

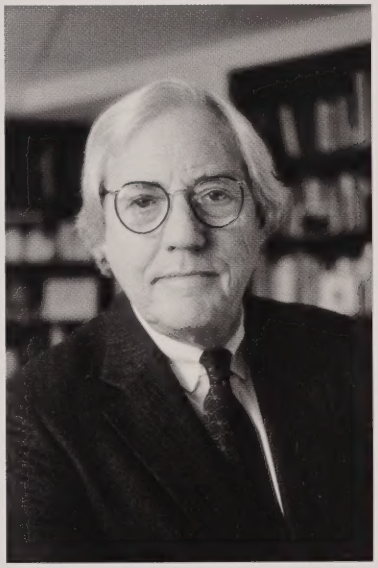
As this country debates how best to provide health care to all its citizens, institutions like the MGH must lead the way in rising to the challenges of a new environment. With the support and cooperation of its physicians, scientists, nurses, staff, and trustees, the MGH will write a new chapter in health care and medicine for the entire country.



Ferdinand Colloredo-Mansfeld
Chairman

This year's annual report focuses on leadership, a characteristic that has featured prominently in the record of the Massachusetts General Hospital. Over the decades, this attribute has been expressed in new and awe-inspiring clinical feats, the development of innovative diagnostic and therapeutic modalities, pioneering efforts in community-based medical care, and the establishment of programs in social work and pastoral care to address yet other important needs of our patients and their families.

Among the various updates on the continuing leadership role of the MGH, this report highlights the contributions of two service chiefs, Drs. W. Gerald Austen, Surgeon-in-Chief, and Richard J. Kitz, Anesthetist-in-Chief. Both of these men have just completed their 25th year at the MGH, during which time they have provided exemplary leadership as clinicians, academicians, and as statesmen in the ever-expanding and increasingly complex world of medicine.



Perhaps the most publicized recent expression of the General's leadership is the alliance with Brigham and Women's Hospital to nucleate the creation of a voluntary not-for-profit integrated regional health care delivery system that will provide the full spectrum of quality care at competitive prices. In this exciting undertaking the partners seek to mobilize the resources of the private sector to address a critical contemporary social issue in a manner that preserves their traditional clinical excellence as well as the best academic and intellectual traditions of the two hospitals and their academic partner, Harvard Medical School. In so doing, they hope to create a successful model that can and will be replicated elsewhere by other academic medical centers.

As this is the last *MGH Annual Report* to which I shall contribute, I want the entire MGH community to know that it has been an extraordinary privilege to serve as General Director for the past 12 years. I am grateful to the Board of Trustees, the Chiefs of Service, colleagues in administration, the professional staff, all employees and volunteers, and my colleagues at Harvard Medical School, most especially Dean Daniel C. Tosteson, MD, for their steadfast and staunch support. Together, we have mobilized the resources, both personnel and materiel, to develop a number of innovative new programs, and we have pioneered the definition of new policies around a number of sensitive issues in clinical medicine and research. We have also recruited new leaders, modernized our clinical facilities, and expanded our commitment to research. It is my hope that, over time, these will prove to be valuable and lasting contributions to the preeminence of the General.

In Samuel O. Thier, MD, the MGH has a new leader with the professional and personal qualities to provide the institution with precisely the kind of leadership that is called for as it faces unprecedented challenges, opportunities, and a new millennium.

Robert G. Buchanan, Jr.

General Director

The General Hospital Corporation

Excerpts from audited financial statements (in thousands of dollars)

Revenues

	1993	1992
Net patient service revenues	$525,463	$498,458
Other Operating Revenues		
Research and other specific purposes	177,409	164,347
Other	29,762	29,160
Total Operating Revenues	**$732,634**	**$691,965**

Expenditures

For operating expenses		
Salaries and related compensation	$342,033	$332,055
Supplies and other expenses	188,762	172,725
Depreciation	45,821	41,253
Interest	14,756	16,872
Provision for doubtful accounts	13,264	12,666
	604,636	575,571
Research and other specific expenses	119,203	111,304
Total Operating Expenditures	**$723,839**	**$686,875**
Surplus (Loss) from operations before adjustments	**8,795**	**5,090**
Adjustment for third party payors, estimated settlements, effect of a change in accounting method and loss on bond refinancings	(8,273)	3,500
Surplus (Loss)	**$522**	**$8,590**

*Year ending September 30, 1993

The Hospital's Dollar

Diagnostic and therapeutic services:
House staff, professional staff, drugs, supplies, etc.

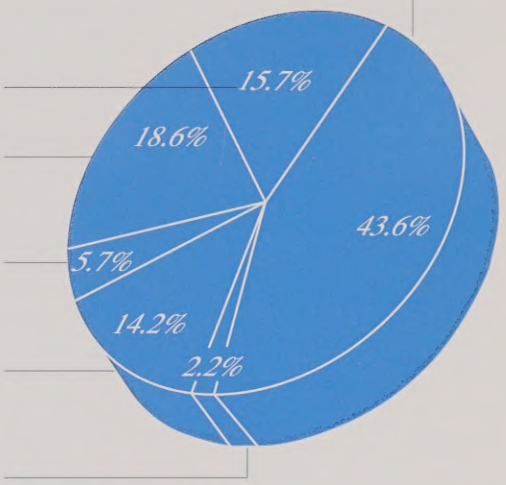
Nursing care:

Plant and equipment:
Depreciation, interest, energy, telephone, maintenance, rent

Room and board services:
Food, laundry, security, housekeeping

Administrative services:
Computer, accounting, administrative salaries, etc.

Provision for Doubtful Accounts:



MGH Facts and Figures

Beds	1,018
Number of admissions	36,821
Number of ambulatory visits	558,446
Emergency department visits *(main campus)*	66,519
Emergency department visits *(Chelsea Health Center)*	16,836
Inpatient surgery	19,554
Day surgery	14,349
Medical staff *(clinical and research)*	2,276
Clinical fellows	309
Residents	527
Research fellows	628
Employees	10,156
RNs	1,264
LPNs	44
Nursing assistants	129
Volunteers	1,371

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as of December 31, 1993

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Private support has allowed the Massachusetts General Hospital to build upon its commitment as an international resource, leading the way in patient care, medical research, and education. The generosity of those who give to the MGH makes a crucial difference in the hospital's ability to fulfill this role. In 1993, the hospital completed its second year of its $160 million Leadership Campaign by raising a record $28.3 million in contributions and pledges.

Types of gifts

Unrestricted

Unrestricted gifts, given directly to the Leadership Campaign or to the MGH Fund, are directed by the hospital's trustees to those areas where the need is most pressing.

Restricted gifts

Donations can be made to a particular specialty or program at the hospital which supports the donor's personal interest.

Endowed funds

A minimum contribution of $25,000 made through either a lifetime gift or by bequest establishes an endowed named fund. The principal is preserved and the income supports the activities of the fund.

Capital donations

Capital gifts for building construction or renovation provide caregivers and researchers with efficient facilities to support their efforts.

Naming opportunities

The hospital encourages donors to consider having their names recognized through a naming opportunity. Commitments starting at $25,000 can be used to name a patient room or create a named fund. Contributions of $100,000 and above can support a department fellowship, provide investigator funding, or name a major inpatient or outpatient area.

Assets to give

Cash

A gift of cash is the simplest and most immediate way to give to the MGH. Cash gifts may be pledged over a period of five years and are fully deductible up to 50% of the donor's adjusted gross income.

Appreciated securities

A gift of long-term appreciated securities is exempt from capital gains taxes, currently at a maximum rate of 28%. In most cases, a donor can claim a charitable income tax deduction equal to the full fair market value of the appreciated securities. The gift is deductible up to 30% of a donor's adjusted gross income.

Real estate

In some cases property can be given outright to support the MGH, and the donor receives a charitable income tax deduction for the fair market value of the property. Gifts of real estate can also be used to fund a life income arrangement.

Life income gifts

Life income arrangements vary, but most options offer the following financial benefits:

- An income for life to the donor and a second beneficiary
- A charitable income tax deduction
- A higher rate of return than many current investments
- A reduction or avoidance capital gains taxes
- Savings on estate and gift taxes
- Professional investment management

Some life income vehicles

Charitable gift annuities

Charitable gift annuities provide the donor with a fixed, high rate of return. Rates are highest for older donors.

MGH High Income Fund

The MGH High Income Fund works like a mutual fund. Gifts are pooled together, and each donor receives a variable rate of return, currently 6.8%. A donor completely avoids capital gains taxes when making a gift to this fund.

Charitable remainder trusts

Charitable remainder trusts are personalized management plans. Donors select a payout rate, usually 5-7%, that pays an income to the donor annually. The rate is based either on a fixed amount of the trust's assets (annuity trust) or is revalued annually based on the principal in the trust that year (unitrust). Trusts are generally established for $100,000 or more.

Bequests

For many donors, a gift made through their will is the best way to make a substantial contribution to the hospital. Donors can leave specific dollar amounts or a percentage of their estate. Through a bequest, a donor can make a gift without depleting current assets and eliminate or reduce federal estate taxes.

For more information

For additional information about making a gift to the Massachusetts General Hospital, please call the Development Office at (617) 726-2200.

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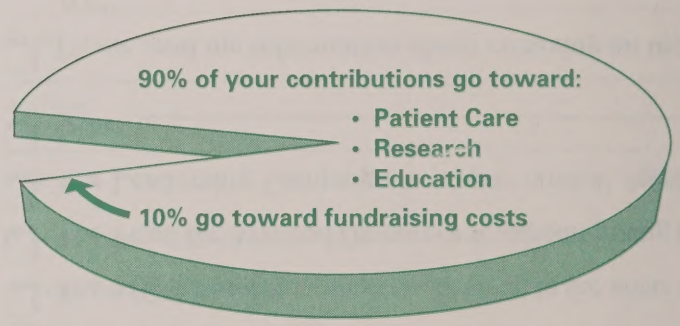

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